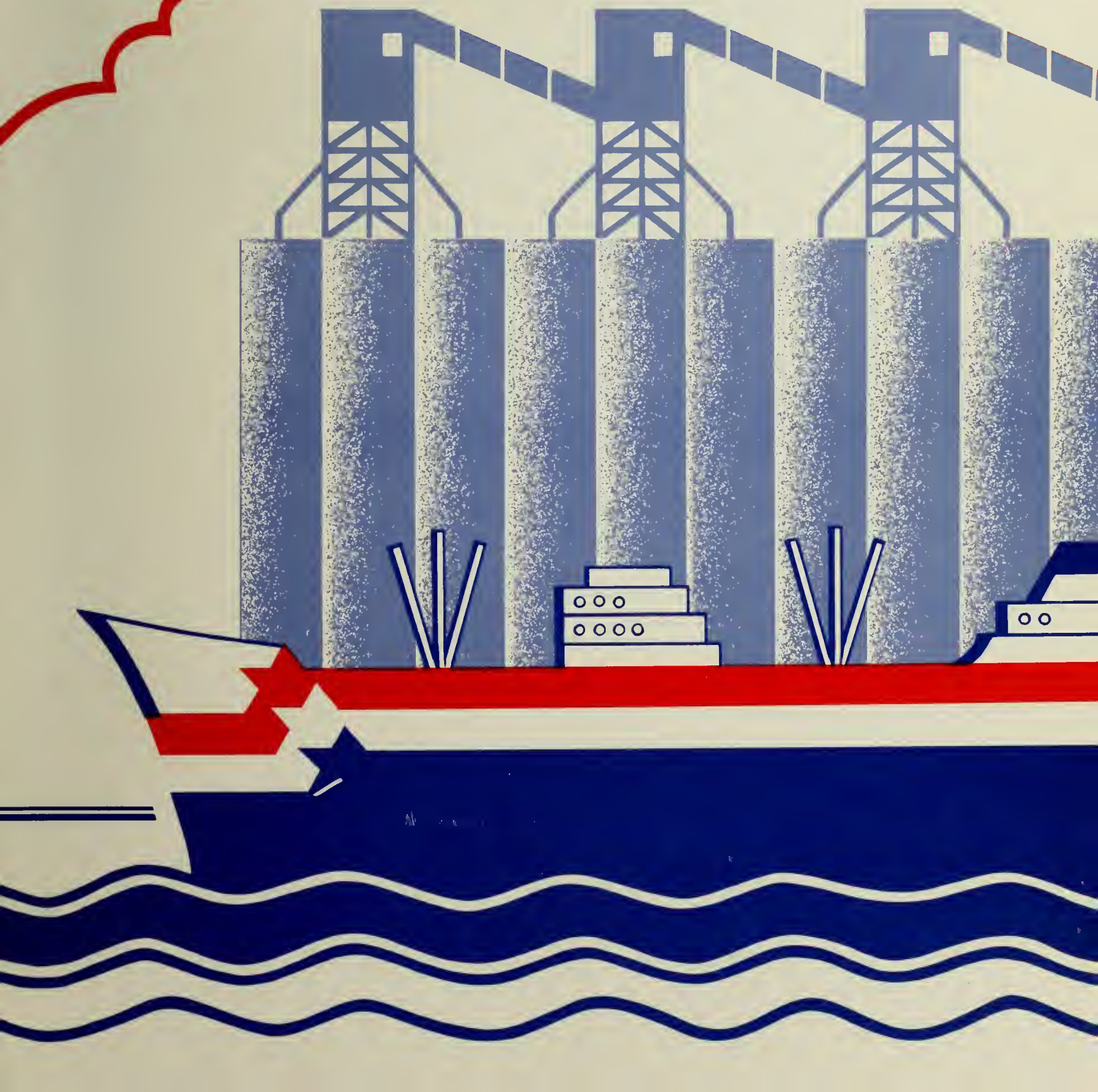
Doc.
A104.12/2-3:
987

United States
Department of
Agriculture

Federal Grain
Inspection
Service

1987 U.S. Grain Export Quality Report

Wheat, Corn, Soybeans



Digitized by the Internet Archive
in 2013

http://archive.org/details/usgrainexportqua1987unse

Contents

	Page
Introduction	**1**
Export Wheat	**3**
Background	4
Wheat Grades and Grade Requirements	5
Conclusions	6
Tables	9
Figures	15
Definitions	18
Export Corn	**19**
Background	20
Corn Grades and Grade Requirements	21
Conclusions	22
Tables	22
Figures	24
Definitions	26
Export Soybeans	**27**
Background	28
Soybean Grades and Grade Requirements	28
Conclusions	29
Tables	29
Figures	31
Definitions	33

May 1988

Introduction

To determine and document U.S. export grain quality, the U.S. Department of Agriculture's Federal Grain Inspection Service (FGIS) analyzed the quality data from export wheat, corn, and soybean lots inspected during calendar year 1987. This is the fourth annual summary of export wheat, corn, and soybean quality published by FGIS.

Last year, FGIS included estimates of domestic new crop wheat, corn, and soybean quality with the export quality information. This year, the domestic new crop quality estimates will be published separately.

For more information regarding this export quality report or the domestic new crop quality reports, contact the Automation and Program Services Branch, Resources Management Division, Federal Grain Inspection Service, U.S. Department of Agriculture, Room 0642 - South, P.O. Box 96454, Washington, D.C., 20090-6454. Telephone (202) 382-1741.

For additional copies of this report, call (202) 475-3367.

Export Wheat

Background

FGIS analyzed the quality data from 2,160 export wheat lots inspected during calendar year 1987. The data represented 99.7 percent of the total 1.14 billion bushels of wheat inspected for export during 1987.

The accompanying tables 1-9 and figures 1-13 represent export wheat data. For comparison purposes, some of the tables and figures include export wheat quality data for calendar years 1984, 1985, and 1986.

Procedural changes which affected wheat protein and dockage certification became effective May 1, 1987.

Since May 1, 1987, all wheat protein results have been certificated on a 12.0 percent moisture basis. Table 6 shows the 1986 and 1987 export wheat protein averages by class for wheat lots on which protein analysis was performed. The table includes average protein results calculated on an "as is" basis, and average protein results calculated on a 12.0 percent moisture basis.

Also, since May 1, 1987, dockage in wheat has been certificated to the nearest 0.1 percent, instead of to half or whole percents.

Wheat represented 29.1 percent of the total 3.92 billion bushels of grains and oilseeds exported in 1987. Gulf of Mexico shipments accounted for 60 percent of the total 1987 wheat exports, and Pacific region shipments accounted for 32 percent of the total. Total 1987 wheat exports increased by 25 percent over 1986 wheat exports.

Wheat Grades and Grade Requirements

Wheat is divided into seven classes: Hard Red Spring wheat, Hard Red Winter wheat, Soft Red Winter wheat, Durum wheat, White wheat, Unclassed wheat, and Mixed wheat. The classes Hard Red Spring wheat, Durum wheat, and White wheat are further divided into subclasses. There are no subclasses in the classes Hard Red Winter wheat, Soft Red Winter wheat, Unclassed wheat, and Mixed wheat. Each class and subclass is divided into five U.S. numerical grades and U.S. Sample grade. Special grades are provided to emphasize special qualities or conditions affecting the value of wheat. Special grades are added to and made a part of the grade designation. They do not affect the numerical or Sample Grade designation.

U.S. Standards for Wheat

Grade	Minimum limits of—		Maximum limits of—						
	Test weight per bushel		Damaged kernels					Wheat of other classes[4]	
	Hard Red Spring wheat or White Club wheat[1] *(pounds)*	All other classes and subclasses *(pounds)*	Heat-damaged kernels *(percent)*	Total[2] *(percent)*	Foreign material *(percent)*	Shrunken and broken kernels *(percent)*	Defects (total)[3] *(percent)*	Contrasting classes *(percent)*	Total[5] *(percent)*
U.S. No. 1	58.0	60.0	0.2	2.0	0.5	3.0	3.0	1.0	3.0
U.S. No. 2	57.0	58.0	0.2	4.0	1.0	5.0	5.0	2.0	5.0
U.S. No. 3	55.0	56.0	0.5	7.0	2.0	8.0	8.0	3.0	10.0
U.S. No. 4	53.0	54.0	1.0	10.0	3.0	12.0	12.0	10.0	10.0
U.S. No. 5	50.0	51.0	3.0	15.0	5.0	20.0	20.0	10.0	10.0
U.S. Sample grade									

U.S. Sample grade shall be wheat that:

(a) Does not meet the requirements for the grades U.S. Nos. 1, 2, 3, 4, or 5; or

(b) Contains 8 or more stones or any number of stones which have an aggregate weight in excess of 0.2 percent of the sample weight, 2 or more pieces of glass, 3 or more crotalaria seeds (*Crotalaria spp.*), 2 or more castor beans (*Ricinus communis*), 4 or more particles of an unknown foreign substance(s) or a commonly recognized harmful or toxic substance(s), 2 or more rodent pellets, bird droppings, or an equivalent quantity of other animal filth per 1,000 grams of wheat; or

(c) Has a musty, sour, or commercially objectionable foreign odor (except smut or garlic odor); or

(d) Is heating or otherwise of distinctly low quality.

[1] These requirements also apply when Hard Red Spring or White Club wheat predominate in a sample of Mixed wheat.
[2] Includes heat-damaged kernels.
[3] Defects include damaged kernels (total), foreign material, and shrunken and broken kernels. The sum of these three factors may not exceed the limit for defects for each numerical grade.
[4] Unclassed wheat of any grade may contain not more than 10.0 percent of wheat of other classes.
[5] Includes contrasting classes.

Conclusions

Ninety-six percent of the wheat inspected for export in 1987 was U.S. No. 2 grade or better. As in previous years, the quality factor averages remained well within the maximum allowed percentages for U.S. No. 2 wheat for each class. Except for test weight in Soft Red Winter wheat, damaged kernels (total) in Durum wheat, and total defects in Hard Red Winter and Durum wheats, the quality factor averages were at or below the maximun allowed percentages (above the minimum for test weight) for U.S. No. 1 wheat.

Hard Red Winter Wheat

The following results are based on 840 Hard Red Winter (HRW) wheat lots inspected for export in 1987, representing 564 million bushels. All except one of the 1987 HRW wheat lots were U.S. No. 2 grade or better. HRW wheat comprised 49.6 percent of the total 1987 wheat exports.

1. The average test weight was 61.0 pounds per bushel. Eighty-six percent of all HRW wheat lots contained test weight levels at or above 60.0, the U.S. No. 1 grade minimum.
2. The average heat-damaged kernels was 0.0. Four percent of the HRW wheat lots contained 0.1 percent heat-damaged kernels. The remaining 96 percent contained 0.0 percent heat-damaged kernels.
3. The average damaged kernels (total) was 1.1 percent, an increase of 0.4 percent over the 1986 average. Ninety-eight percent of all 1987 HRW wheat lots contained damaged kernels (total) levels at or less than the U.S. No. 1 grade maximum of 2.0 percent.
4. The average foreign material was 0.3 percent. Ninety-seven percent of all HRW wheat lots contained foreign material levels at or less than the U.S. No. 1 grade maximum of 0.5 percent.
5. The average shrunken and broken kernels was 2.4 percent. This represents a 0.3-percent decrease from the 1986 average. Ninety-five percent of all the 1987 HRW wheat lots contained shrunken and broken kernels levels at or below the U.S. No. 1 grade maximum of 3.0 percent.
6. The average total defects was 3.8 percent. Thirty-six percent of all HRW wheat lots contained total defects levels at or less than the U.S. No. 1 grade maximum of 3.0 percent. All HRW wheat lots contained total defects levels at or less than the U.S. No. 2 grade maximum of 5.0 percent.
7. The average contrasting classes was 0.0 percent. Seventy-four percent of the HRW wheat lots contained contrasting classes levels of 0.0 percent. All except four HRW wheat lots contained contrasting classes levels at or less than 1.0 percent, the U.S. No. 1 grade maximum.
8. The average wheat of other classes was 1.2 percent. Ninety-two percent of the HRW wheat lots contained wheat of other classes levels at or less than 3.0 percent, the U.S. No. 1 grade maximum.
9. The average dockage was 0.6 percent. This represents a 0.1-percent decrease from the 1986 average. All except four HRW wheat lots contained dockage levels at or less than 1.0 percent. Twelve percent of the HRW wheat lots contained dockage levels less than 0.5 percent.
10. The average moisture was 11.5 percent. All of the HRW wheat lots contained moisture levels at or less than 13.0 percent.

Soft Red Winter Wheat

The following results are based on 203 Soft Red Winter (SRW) wheat lots inspected for export in 1987, representing 140 million bushels. All of the 1987 SRW wheat lots were U.S. No. 2 grade or better. SRW wheat comprised 12.3 percent of the total 1987 wheat exports.

1. The average test weight was 58.6 pounds per bushel. This represents a 0.5-pounds-per-bushel decrease from the 1986 average. Five percent of the SRW wheat lots contained test weight levels at or above the U.S. No. 1 grade minimum of 60.0. The remaining 95 percent contained test weight levels which met the minimum requirements for U.S. No. 2 grade.
2. The average heat-damaged kernels was 0.0. All except one SRW wheat lot contained 0.0 percent heat-damaged kernels.
3. The average damaged kernels (total) was 1.3 percent. This represents a 0.2-percent decrease from the 1986 average. Eighty-one percent of all SRW wheat lots contained damaged kernels (total) levels at or less than the U.S. No. 1 grade maximum of 2.0 percent.
4. The average foreign material was 0.2 percent. Ninety-eight percent of all SRW wheat lots contained foreign material levels at or less than the U.S. No. 1 grade maximum of 0.5 percent.
5. The average shrunken and broken kernels was 1.2 percent. All of the SRW wheat lots contained shrunken and broken kernel levels less than the U.S. No. 1 grade maximum of 3.0 percent.
6. The average total defects was 2.8 percent. Sixty-three percent of the SRW wheat lots contained total defects levels at or less than 3.0 percent, the U.S. No. 1 grade maximum.
7. The average contrasting classes was 0.0 percent. All except five SRW wheat lots contained contrasting classes levels of 0.0 percent.

8. The average wheat of other classes was 0.3 percent, a decrease of 0.4 percent from the 1986 average. Fifty-three percent of the SRW wheat lots contained no wheat of other classes. Eighty-nine percent contained wheat of other classes levels less than or equal to 1.0 percent.
9. The average dockage was 0.8 percent. Eighty-seven percent of all SRW wheat lots contained dockage levels at or less than 1.0 percent. Two SRW wheat lots contained dockage levels less than 0.5 percent.
10. The average moisture was 12.8 percent. This represents a 0.3-percent decrease from the 1986 average. Eighty-three percent of the SRW wheat lots contained moisture levels at or less than 13.0 percent. All of the SRW wheat lots contained moisture levels at or less than 13.5 percent.

White Wheat

The following results are based on 381 White wheat lots inspected for export in 1987, representing 184 million bushels. All except one lot were U.S. No. 2 grade or better. White wheat comprised 16.1 percent of the total 1987 wheat exports.

1. The average test weight was 61.3 pounds per bushel. This represents a 0.5-pounds-per-bushel increase over the 1986 average. Ninety-eight percent of all White wheat lots contained test weight levels at or above 60.0 pounds per bushel.
2. The average heat-damaged kernels was 0.0 percent. All except four White wheat lots contained 0.0 percent heat-damaged kernels.
3. The average damaged kernels (total) was 0.4 percent. All of the White wheat lots contained damaged kernel (total) levels less than the U.S. No. 1 grade maximum of 2.0 percent.
4. The average foreign material was 0.3 percent. Ninety-seven percent of all White wheat lots contained foreign material levels at or less than the U.S. No. 1 grade. maximum of 0.5 percent.
5. The average shrunken and broken kernels was 1.3 percent. This represents a 0.2-percent decrease from the 1986 average. All of the White wheat lots contained shrunken and broken kernel levels less than the U.S. No. 1 grade maximum of 3.0 percent.
6. The average total defects was 2.0 percent. This represents a 0.3-percent decrease from the 1986 average. All of the White wheat lots contained total defects levels less than the U.S. No. 1 grade maximum of 3.0 percent.
7. The average contrasting classes was 0.3 percent. Ninety-seven percent of all White wheat lots contained contrasting classes levels at or less than the U.S. No. 1 grade maximum of 1.0 percent.
8. The average wheat of other classes was 0.3 percent. All of the White wheat lots contained wheat of other classes levels less than the 3.0 percent maximum for U.S. No. 1 grade.
9. The average dockage was 0.6 percent. This represents a 0.1-percent decrease from the 1986 average. Fourteen percent of all 1987 White wheat lots contained dockage levels at or less than 0.5 percent. Ninety-nine percent of all White wheat lots contained dockage levels at or less than 1.0 percent.
10. The average moisture was 9.8 percent. Seventy-four percent of all White wheat lots contained moisture levels of 10.0 percent or less. None of the White wheat lots contained moisture levels greater than 11.2 percent.

Hard Red Spring Wheat

The following results are based on 531 Hard Red Spring (HRS) wheat lots inspected for export in 1987, representing 179 million bushels. All except three HRS wheat lots were U.S. No. 2 grade or better. HRS wheat comprised 15.7 percent of the total 1987 wheat exports.

1. The average test weight was 60.6 pounds per bushel. Ninety-seven percent of all HRS wheat lots contained test weight levels at or above the U.S. No. 1 grade minimum of 58.0 pounds per bushel.
2. The average heat-damaged kernels was 0.0 percent. Ninety-nine percent of the HRS wheat lots contained 0.0 percent heat-damaged kernels.
3. The average damaged kernels (total) was 1.1 percent. This represents a 0.3-percent increase over the 1986 average. Eighty-one percent of the HRS wheat lots contained damaged kernels (total) levels at or less than the U.S. No. 1 grade maximum of 2.0 percent.
4. The average foreign material was 0.3 percent. Ninety-five percent of the HRS wheat lots contained foreign material levels at or less than the U.S. No. 1 grade maximum of 0.5 percent.
5. The average shrunken and broken kernels was 1.6 percent. This represents a 0.2-percent decrease from the 1986 average. All of the HRS wheat lots contained shrunken and broken kernels levels less than the U.S. No. 1 grade maximum of 3.0 percent.
6. The average total defects was 3.0 percent. Fifty-seven percent of all HRS wheat lots contained total defects levels at or less than 3.0 percent, the U.S. No. 1 grade maximum.
7. The average contrasting classes was 0.2 percent. Ninety-nine percent of the HRS wheat lots contained contrasting classes levels at or less than the U.S. No. 1 grade maximum of 1.0 percent.

8. The average wheat of other classes was 0.8 percent. This represents a 0.2-percent decrease from the 1986 average. Ninety-nine percent of the HRS wheat lots contained wheat of other classes levels at or less than the U.S. No. 1 grade maximum of 3.0 percent.
9. The average dockage was 0.9 percent. Seventy-one percent of the HRS wheat lots contained dockage levels at or less than 1.0 percent. Ninety-seven percent of the HRS wheat lots contained dockage levels at or less than 1.5 percent.
10. The average moisture was 11.8 percent. None of the HRS wheat lots contained moisture levels greater than 13.3 percent. Fifty-four percent of the HRS wheat lots contained moisture levels at or less than 12.0 percent.

Durum Wheat

The following results are based on 199 Durum wheat lots inspected for export in 1987, representing 69 million bushels. Forty-three percent of the 1987 Durum wheat lots were U.S. No. 2 grade or better. Fifty-six percent of the Durum wheat lots were U.S. No. 3 grade. One Durum wheat lot was U.S. No. 4 grade. Durum wheat comprised 6.1 percent of the total 1987 wheat exports.

1. The average test weight was 60.0 pounds per bushel. This represents a 0.9-pound-per-bushel decrease from the 1986 average. Ninety-eight percent of the Durum wheat lots contained test weight levels at or greater than the U.S. No. 2 grade minimum of 58.0 pounds per bushel.
2. The average heat-damaged kernels was 0.0 percent. Ninety-eight percent of the Durum wheat lots contained 0.0 percent heat-damaged kernels.
3. The average damaged kernels (total) was 3.5 percent. This represents a 1.4-percent increase over the 1986 average. The average for U.S. No. 2 lots was 2.2 percent, (a 0.9-percent increase over the 1986 average for U.S. No. 2 lots). The average for U.S. No. 3 lots was 4.3 percent (a 1.8-percent increase over the 1986 average for U.S. No. 3 lots). Sixty-four percent of the 1987 Durum wheat lots contained damaged kernels (total) levels at or less than the U.S. No. 2 grade maximum of 4.0 percent.
4. The average foreign material was 0.4 percent. This represents a 0.3 percent decrease from the 1986 average. Seventy-five percent of the 1987 Durum wheat lots contained foreign material levels at or less than the U.S. No. 1 grade maximum of 0.5 percent. Ninety-eight percent of the lots contained foreign material levels at or less than the U.S. No. 2 grade maximum of 1.0 percent.
5. The average shrunken and broken kernels was 1.6 percent. All of the Durum wheat lots contained shrunken and broken kernels levels less than the U.S. No. 1 grade maximum of 3.0 percent.
6. The average total defects was 5.6 percent. This represents a 1.2-percent increase over the 1986 average. The increase in average total damaged kernels contributed to the increase in average total defects. Forty-seven percent of the 1987 Durum wheat lots contained total defects levels at or less than the U.S. No. 2 grade maximum of 5.0 percent.
7. The average contrasting classes was 0.9 percent. Ninety-eight percent of the Durum wheat lots contained contrasting classes levels at or less than the U.S. No. 2 grade maximum of 2.0 percent.
8. The average dockage was 1.1 percent. This represents a 0.2-percent increase over the 1986 average. Forty-seven percent of the 1987 Durum wheat lots contained dockage levels at or less than 1.0 percent. Eighty-nine percent contained dockage levels at or less than 1.5 percent.
9. The average moisture was 12.3 percent. This represents a 0.2-percent decrease from the 1986 average. Ninety-four percent of the 1987 Durum wheat lots contained moisture levels at or less than 13.0 percent.

Table 1. Summary of export Hard Red Winter wheat quality, 1986 and 1987

Factor	No. 2 Grade limit	1986 Average[1]	1987 Average[2]	1987 Range[2]
Test Weight	58.0	61.1	61.0	58.0 - 64.8
Heat-Damaged Kernels	0.2	0.0	0.0	0.0 - 0.1
Damaged Kernels (total)	4.0	0.7	1.1	0.0 - 2.4
Foreign Material	1.0	0.3	0.3	0.0 - 1.0
Shrunken and Broken	5.0	2.7	2.4	0.4 - 4.0
Total Defects[3]	5.0	3.7	3.8	0.5 - 5.0
Contrasting Classes	2.0	0.0	0.0	0.0 - 1.3
Wheat of Other Classes	5.0	1.3	1.2	0.0 - 10.0
Dockage	N/A	0.7	0.6	0.1 - 1.2
Moisture	N/A	11.5	11.5	8.0 - 13.0

N/A = Not applicable.
[1] The 1986 results are based on 39 lots of U.S. No. 1 grade, 654 lots of U.S. No. 2 grade, and 2 lots of U.S. No. 3 grade.
[2] The 1987 results are based on 52 lots of U.S. No. 1 grade, 787 lots of U.S. No. 2 grade, and 1 lot of U.S. No. 3 grade.
[3] The sum of the component factor averages may not equal the average for this factor due to rounding.

Table 2. Summary of export Soft Red Winter wheat quality, 1986 and 1987

Factor	No. 2 Grade limit	1986 Average[1]	1987 Average[2]	1987 Range[2]
Test Weight	58.0	59.1	58.6	58.0 - 60.9
Heat-Damaged Kernels	0.2	0.0	0.0	0.0 - 0.1
Damaged Kernels (total)	4.0	1.5	1.3	0.2 - 3.4
Foreign Material	1.0	0.2	0.2	0.0 - 0.8
Shrunken and Broken	5.0	1.2	1.2	0.5 - 1.9
Total Defects[3]	5.0	2.9	2.8	1.3 - 5.0
Contrasting Classes	2.0	0.0	0.0	0.0 - 0.5
Wheat of Other Classes	5.0	0.7	0.3	0.0 - 3.8
Dockage	N/A	0.8	0.8	0.4 - 2.1
Moisture	N/A	13.1	12.8	12.0 - 13.5

N/A = Not applicable.
[1] The 1986 results are based on 276 lots of U.S. No. 2 grade and 5 lots of U.S. No. 3 grade.
[2] The 1987 results are based on 1 lot of U.S. No. 1 grade and 202 lots of U.S. No. 2 grade.
[3] The sum of the component factor averages may not equal the average for this factor due to rounding.

Table 3. Summary of export White wheat quality, 1986 and 1987

Factor	No. 2 Grade limit	1986 Average[1]	1987 Average[2]	1987 Range[2]
Test Weight	58.0	60.8	61.3	59.4 - 63.2
Heat-Damaged Kernels	0.2	0.0	0.0	0.0 - 0.1
Damaged Kernels (total)	4.0	0.5	0.4	0.0 - 1.9
Foreign Material	1.0	0.3	0.3	0.0 - 1.8
Shrunken and Broken	5.0	1.5	1.3	0.8 - 2.4
Total Defects[3]	5.0	2.3	2.0	0.9 - 3.7
Contrasting Classes	2.0	0.2	0.3	0.0 - 1.5
Wheat of Other Classes	5.0	0.3	0.3	0.0 - 1.5
Dockage	N/A	0.7	0.6	0.2 - 1.4
Moisture	N/A	9.9	9.8	8.8 - 11.2

N/A = Not applicable.
[1] The 1986 results are based on 66 lots of U.S. No. 1 grade and 323 lots of U.S. No. 2 grade.
[2] The 1987 results are based on 52 lots of U.S. No. 1 grade, 328 lots of U.S. No. 2 grade, and 1 lot of U.S. No. 3 grade.
[3] The sum of the component factor averages may not equal the average for this factor due to rounding.

Table 4. Summary of export Hard Red Spring wheat quality, 1986 and 1987

Factor	No. 2 Grade limit	1986 Average[1]	1987 Average[2]	1987 Range[2]
Test Weight	57.0	60.5	60.6	57.0 - 63.5
Heat-Damaged Kernels	0.2	0.0	0.0	0.0 - 0.1
Damaged Kernels (total)	4.0	0.8	1.1	0.0 - 4.7
Foreign Material	1.0	0.3	0.3	0.1 - 1.2
Shrunken and Broken	5.0	1.8	1.6	0.7 - 2.8
Total Defects[3]	5.0	2.9	3.0	0.9 - 6.6
Contrasting Classes	2.0	0.2	0.2	0.0 - 1.5
Wheat of Other Classes	5.0	1.0	0.8	0.0 - 4.2
Dockage	N/A	0.9	0.9	0.3 - 2.5
Moisture	N/A	11.9	11.8	9.0 - 13.3

N/A = Not applicable.
[1] The 1986 results are based on 42 lots of U.S. No. 1 grade, 578 lots of U.S. No. 2 grade, and 1 lot of U.S. No. 3 grade.
[2] The 1987 results are based on 32 lots of U.S No. 1 grade, 496 lots of U.S. No. 2 grade, and 3 lots of U.S. No. 3 grade.
[3] The sum of the component factor averages may not equal the average for this factor due to rounding.

Table 5. Summary of export Durum wheat quality, 1986 and 1987

Factor	Grade	Grade limit	1986 Average[1]	1987 Average[2]	1987 Range[2]
Test Weight	U.S. No. 2	58.0	61.2	60.7	58.3 - 63.5
	U.S. No. 3	56.0	60.7	59.6	57.5 - 61.5
	All lots	N/A	60.9	60.0	57.3 - 63.5
Heat-Damaged Kernels	U.S. No. 2	0.2	0.0	0.0	0.0 - 0.1
	U.S. No. 3	0.5	0.0	0.0	0.0 - 0.1
	All Lots	N/A	0.0	0.0	0.0 - 0.1
Damaged Kernels (total)	U.S. No. 2	4.0	1.3	2.2	0.2 - 3.3
	U.S. No. 3	7.0	2.5	4.3	1.3 - 5.5
	All Lots	N/A	2.1	3.5	0.0 - 5.5
Foreign Material	U.S. No. 2	1.0	0.3	0.3	0.0 - 0.7
	U.S. No. 3	2.0	0.9	0.5	0.2 - 1.3
	All Lots	N/A	0.7	0.4	0.0 - 1.4
Shrunken and Broken	U.S. No. 2	5.0	1.4	1.5	0.7 - 2.1
	U.S. No. 3	8.0	1.6	1.7	1.0 - 2.3
	All Lots	N/A	1.5	1.6	0.4 - 2.3
Total Defects[3]	U.S. No. 2	5.0	3.0	4.0	1.0 - 5.0
	U.S. No. 3	8.0	4.9	6.5	3.3 - 7.8
	All Lots	N/A	4.4	5.6	0.6 - 8.4
Contrasting Classes	U.S. No. 2	2.0	0.6	0.7	0.0 - 1.9
	U.S. No. 3	3.0	1.1	0.9	0.3 - 2.6
	All Lots	N/A	1.0	0.9	0.0 - 2.6
Dockage	All lots	N/A	0.9	1.1	0.1 - 2.3
Moisture	All lots	N/A	12.5	12.3	7.5 - 13.4

N/A = Not applicable.
[1] The 1986 results are based on 2 lots of U.S. No. 1 grade, 92 lots of U.S. No. 2 grade, and 163 lots of U.S. No. 3 grade.
[2] The 1987 results are based on 9 lots of U.S. No. 1 grade, 78 lots of U.S. No. 2 grade, 111 lots of U.S. No. 3 grade, and 1 lot of U.S. No. 4 grade.
[3] The sum of the component factor averages may not equal the average for this factor due to rounding.

Table 6. Export wheat protein averages, by class, 1986 and 1987

Class	Number of lots with protein reported	Percent of class volume represented	Protein average (as is basis)	Protein Average (12 percent moisture basis)[1]
HRW				
1986	479	62.6	11.9	11.8
1987	480	48.7	11.9	11.8
SRW				
1986	25	5.3	10.1	10.2
1987	16	7.2	10.8	10.9
WW				
1986	224	52.9	10.9	10.7
1987	236	50.8	10.5	10.3
HRS				
1986	547	87.7	14.1	14.1
1987	435	79.3	14.1	14.0
DU				
1986	23	7.3	14.0	13.9
1987	21	8.6	13.6	13.6

[1] Effective May 1, 1987, all wheat protein results were certificated on a 12.0-percent moisture basis.

Table 7. Summary of export wheat quality, factor averages by class and region, 1986 and 1987

		Atlantic		Gulf		Great Lakes		Pacific		Interior		U.S.	
Class	Volume and factor	1986	1987	1986	1987	1986	1987	1986	1987	1986	1987	1986	1987
HRW	(Million bushels)	—	—	294	467	—	2	72	95	—	<1	366	564
	Test Weight	—	—	60.8	60.7	—	60.6	62.3	62.8	—	62.0	61.1	61.0
	Heat-Damaged Kernels	—	—	0.0	0.0	—	0.0	0.0	0.0	—	0.0	0.0	0.0
	Damaged Kernels (total)	—	—	0.8	1.2	—	0.8	0.2	0.2	—	0.1	0.7	1.1
	Foreign Material	—	—	0.3	0.3	—	0.3	0.3	0.3	—	0.1	0.3	0.3
	Shrunken and Broken	—	—	2.8	2.5	—	2.3	2.2	1.8	—	2.0	2.7	2.4
	Total Defects[1]	—	—	4.0	4.1	—	3.3	2.7	2.3	—	2.1	3.7	3.8
	Contrasting Classes	—	—	0.0	0.0	—	0.1	0.2	0.2	—	0.2	0.0	0.0
	Wheat of Other Classes	—	—	1.4	1.2	—	2.3	0.8	1.3	—	1.2	1.3	1.2
	Dockage	—	—	0.7	0.7	—	0.7	0.6	0.6	—	0.3	0.7	0.6
	Moisture	—	—	11.7	11.7	—	11.6	10.6	10.4	—	10.0	11.5	11.5
SRW	(Million bushels)	25	23	101	116	10	1	1	—	—	—	136	140
	Test Weight	60.6	59.8	58.8	58.4	58.6	58.3	59.0	—	—	—	59.1	58.6
	Heat-Damaged Kernels	0.0	0.0	0.0	0.0	0.0	0.0	0.0	—	—	—	0.0	0.0
	Damaged Kernels (total)	1.1	1.2	1.5	1.4	1.9	2.6	0.2	—	—	—	1.5	1.3
	Foreign Material	0.2	0.2	0.2	0.2	0.1	0.2	0.2	—	—	—	0.2	0.2
	Shrunken and Broken	0.8	0.8	1.3	1.3	0.9	0.6	0.8	—	—	—	1.2	1.2
	Total Defects[1]	2.1	2.2	3.1	2.9	2.9	3.4	1.2	—	—	—	2.9	2.8
	Contrasting Classes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	—	—	—	0.0	0.0
	Wheat of Other Classes	1.1	0.3	0.5	0.3	1.9	3.6	1.2	—	—	—	0.7	0.3
	Dockage	0.7	0.7	0.8	0.8	0.8	0.7	0.5	—	—	—	0.8	0.8
	Moisture	13.2	13.0	13.0	12.8	13.3	13.1	13.3	—	—	—	13.1	12.8

Table 7. (continued)

Class	Volume and factor	Atlantic 1986	Atlantic 1987	Gulf 1986	Gulf 1987	Great Lakes 1986	Great Lakes 1987	Pacific 1986	Pacific 1987	Interior 1986	Interior 1987	U.S. 1986	U.S. 1987
WW	(Million bushels)	2	—	—	—	2	<1	153	183	—	<1	157	184
	Test Weight	60.1	—	—	—	60.4	60.9	60.8	61.3	—	60.0	60.8	61.3
	Heat-Damaged Kernels	0.0	—	—	—	0.0	0.0	0.0	0.0	—	0.0	0.0	0.0
	Damaged Kernels (total)	1.9	—	—	—	3.0	0.1	0.4	0.4	—	0.7	0.5	0.4
	Foreign Material	0.1	—	—	—	0.1	0.1	0.3	0.3	—	0.2	0.3	0.3
	Shrunken and Broken	0.6	—	—	—	0.6	0.8	1.6	1.3	—	1.4	1.5	1.3
	Total Defects[1]	2.6	—	—	—	3.7	1.0	2.3	2.0	—	2.2	2.3	2.0
	Contrasting Classes	0.0	—	—	—	0.0	0.4	0.2	0.3	—	0.6	0.2	0.3
	Wheat of Other Classes	0.5	—	—	—	2.3	0.4	0.2	0.3	—	0.6	0.3	0.3
	Dockage	0.8	—	—	—	0.6	1.4	0.7	0.6	—	0.7	0.7	0.6
	Moisture	13.4	—	—	—	13.1	9.6	9.8	9.8	—	10.0	9.9	9.8
HRS	(Million bushels)	—	—	66	67	29	23	83	90	—	—	178	179
	Test Weight	—	—	59.6	59.2	59.4	59.1	61.6	62.1	—	—	60.5	60.6
	Heat-Damaged Kernels	—	—	0.0	0.0	0.0	0.0	0.0	0.0	—	—	0.0	0.0
	Damaged Kernels (total)	—	—	1.1	2.0	1.2	1.8	0.3	0.3	—	—	0.8	1.1
	Foreign Material	—	—	0.4	0.4	0.5	0.4	0.3	0.3	—	—	0.3	0.3
	Shrunken and Broken	—	—	1.9	1.8	1.9	1.8	1.6	1.3	—	—	1.8	1.6
	Total Defects[1]	—	—	3.4	4.2	3.5	3.9	2.2	1.9	—	—	2.9	3.0
	Contrasting Classes	—	—	0.2	0.1	0.2	0.2	0.3	0.3	—	—	0.2	0.2
	Wheat of Other Classes	—	—	0.8	0.8	1.1	0.8	1.0	0.8	—	—	1.0	0.8
	Dockage	—	—	0.9	1.0	1.0	1.0	0.8	0.8	—	—	0.9	0.9
	Moisture	—	—	12.5	12.5	12.7	12.5	11.2	11.1	—	—	11.9	11.8
DU	(Million bushels)	—	—	21	32	42	35	7	2	—	<1	70	69
	Test Weight	—	—	61.1	60.4	60.6	59.5	62.3	61.8	—	62.2	60.9	60.0
	Heat-Damaged Kernels	—	—	0.0	0.0	0.0	0.0	0.0	0.0	—	0.0	0.0	0.0
	Damaged Kernels (total)	—	—	1.6	3.2	2.7	4.1	0.4	0.3	—	0.6	2.1	3.5
	Foreign Material	—	—	0.4	0.4	1.0	0.5	0.2	0.2	—	0.1	0.7	0.4
	Shrunken and Broken	—	—	1.3	1.4	1.7	1.8	1.0	1.0	—	0.6	1.5	1.6
	Total Defects[1]	—	—	3.3	5.0	5.4	6.4	1.7	1.5	—	1.2	4.4	5.6
	Contrasting Classes	—	—	1.1	0.7	1.1	1.0	0.3	0.5	—	0.6	1.0	0.9
	Dockage	—	—	0.8	1.1	1.0	1.2	0.8	1.0	—	0.2	0.9	1.1
	Moisture	—	—	12.4	12.2	12.9	12.7	10.3	9.1	—	11.8	12.5	12.3

[1] The sum of the component factor averages may not equal the average for this factor due to rounding.

Table 8. Summary of export wheat quality, factor averages by class, 1984-87

Class	Volume and factor	1984	1985	1986	1987
HRW	(Million bushels)	738	397	366	564
	Test Weight	61.7	61.3	61.1	61.0
	Heat-Damaged Kernels	0.0	0.0	0.0	0.0
	Damaged Kernels (total)	0.7	0.6	0.7	1.1
	Foreign Material	0.3	0.3	0.3	0.3
	Shrunken and Broken	2.5	2.6	2.7	2.4
	Total Defects[1]	3.5	3.4	3.7	3.8
	Contrasting Classes	0.0	0.1	0.0	0.0
	Wheat of Other Classes	2.2	1.6	1.3	1.2
	Dockage	0.6	0.7	0.7	0.6
	Moisture	11.6	11.5	11.5	11.5

Table 8. Summary of export wheat quality, factor averages by class, 1984-87, (continued)

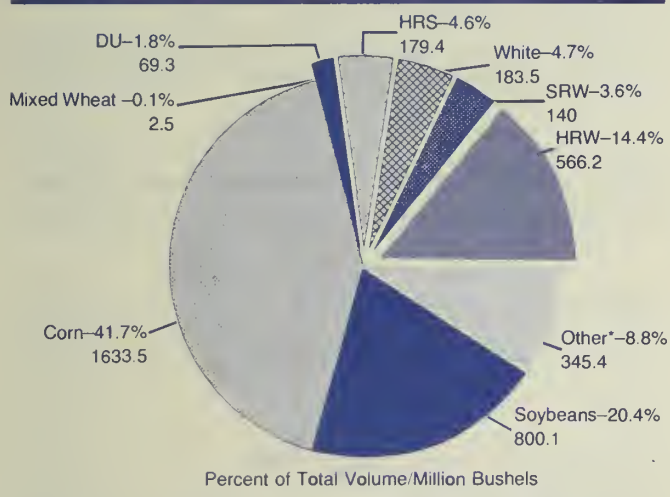
Class	Volume and factor	1984	1985	1986	1987
SRW	(Million bushels)	222	131	136	140
	Test Weight	59.8	59.9	59.1	58.6
	Heat-Damaged Kernels	0.0	0.0	0.0	0.0
	Damaged Kernels (total)	0.9	0.9	1.5	1.3
	Foreign Material	0.2	0.2	0.2	0.2
	Shrunken and Broken	0.9	1.0	1.2	1.2
	Total Defects[1]	2.0	2.0	2.9	2.8
	Contrasting Classes	0.0	0.0	0.0	0.0
	Wheat of Other Classes	0.4	0.3	0.7	0.3
	Dockage	0.7	0.8	0.8	0.8
	Moisture	13.0	13.0	13.1	12.8
WW	(Million bushels)	199	150	157	184
	Test Weight	61.3	61.1	60.8	61.3
	Heat-Damaged Kernels	0.0	0.0	0.0	0.0
	Damaged Kernels (total)	0.5	0.5	0.5	0.4
	Foreign Material	0.3	0.3	0.3	0.3
	Shrunken and Broken	1.0	1.2	1.5	1.3
	Total Defects[1]	1.8	2.0	2.3	2.0
	Contrasting Classes	0.2	0.2	0.2	0.3
	Wheat of Other Classes	0.2	0.5	0.3	0.3
	Dockage	0.6	0.7	0.7	0.6
	Moisture	10.4	10.4	9.9	9.8
HRS	(Million bushels)	170	154	178	179
	Test Weight	60.8	60.8	60.5	60.6
	Heat-Damaged Kernels	0.0	0.0	0.0	0.0
	Damaged Kernels (total)	0.6	0.5	0.8	1.1
	Foreign Material	0.4	0.3	0.3	0.3
	Shrunken and Broken	2.2	2.0	1.8	1.6
	Total Defects[1]	3.2	2.9	2.9	3.0
	Contrasting Classes	0.3	0.2	0.2	0.2
	Wheat of Other Classes	1.4	1.3	1.0	0.8
	Dockage	0.9	0.8	0.9	0.9
	Moisture	11.5	11.5	11.9	11.8
DU	(Million bushels)	66	46	70	69
	Test Weight	60.8	61.2	60.9	60.0
	Heat-Damaged Kernels	0.0	0.0	0.0	0.0
	Damaged Kernels (total)	1.5	1.3	2.1	3.5
	Foreign Material	0.8	0.6	0.7	0.4
	Shrunken and Broken	2.3	1.8	1.5	1.6
	Total Defects[1]	4.5	3.7	4.4	5.6
	Contrasting Classes	1.4	1.2	1.0	0.9
	Dockage	1.1	0.9	0.9	1.1
	Moisture	11.4	11.5	12.5	12.3

[1] The sum of the component factor averages may not equal the average for this factor due to rounding.

Table 9. U.S. Wheat exports: Number of lots and volume certificated by grade and wheat class, 1987

Grade	HRW		SRW		White		HRS		Durum		Mixed		U.S. Total	
	Number of Lots	Million Bushels	Number of Lots	Million Bushels	Number of Lots	Million Bushels	Number of Lots	Million Bushels	Number of Lots	Million Bushels	Number of Lots	Million Bushels	Number of Lots	Million Bushels
U.S. No. 1	57	11.9	1	0.2	52	5.9	32	13.3	9	1.6	0	0.0	151	32.9
U.S. No. 2	810	554.2	202	139.8	328	177.6	496	164.9	78	21.9	6	2.5	1,920	1,060.9
U.S. No. 3	1	0.0	0	0.0	1	0.0	3	1.3	111	45.9	0	0.0	116	47.2
U.S. No. 4	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	1	0.0
U.S. No. 5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
U.S. Sample Grade	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	**868**	**566.1**	**203**	**140.0**	**381**	**183.5**	**531**	**179.5**	**199**	**69.4**	**6**	**2.5**	**2,188**	**1,141.0**

Figure 1
1987 U.S. Grain Exports — Wheat Classes -vs- All Other Grains



* Other includes sorghum, barley, rye, oats, flaxseed, and sunflower seeds.

Figure 2
Annual U.S. Wheat Export Volume — By Class

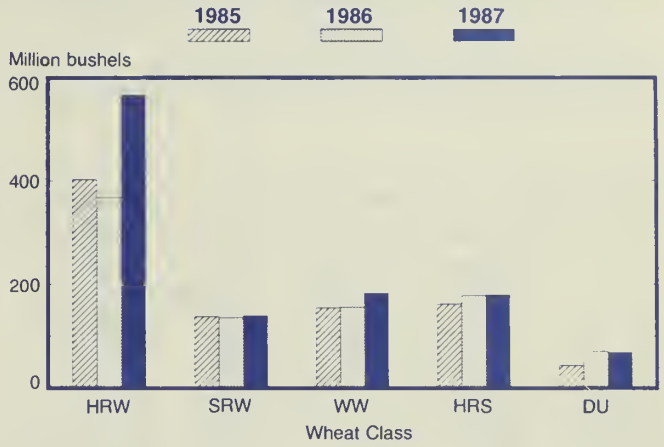


Figure 3
Annual U.S. Wheat Export Volume — By Port Region

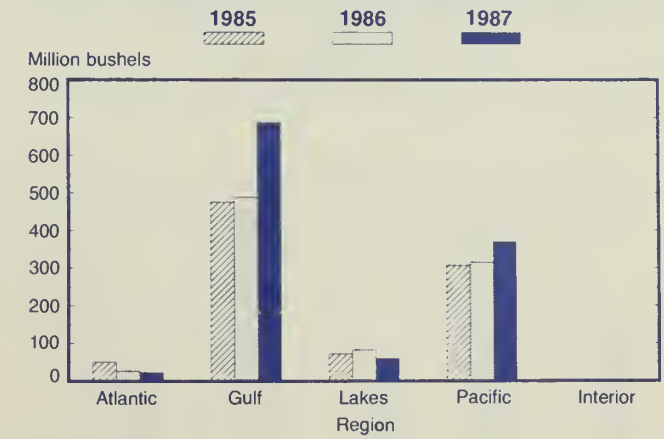
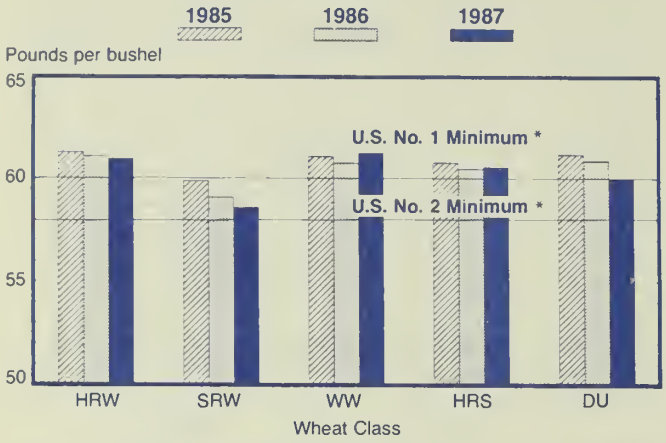


Figure 4
Export Wheat — Average Test Weight per Bushel



* HRS and White Club minimums: No. 1-58.0; No. 2-57.0

Figure 5
Export Wheat — Average Damaged Kernels (Total)

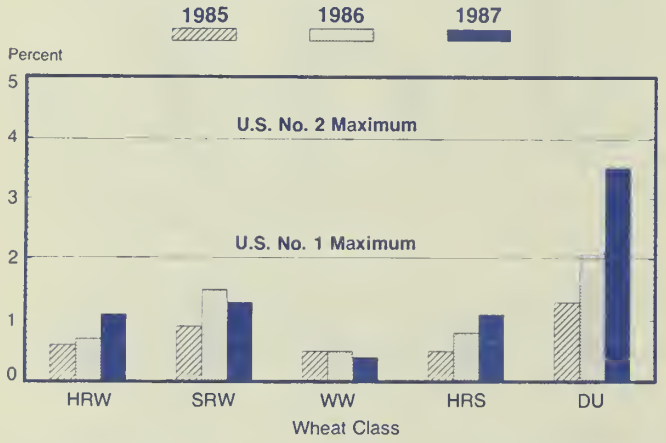


Figure 6
Export Wheat — Average Foreign Material

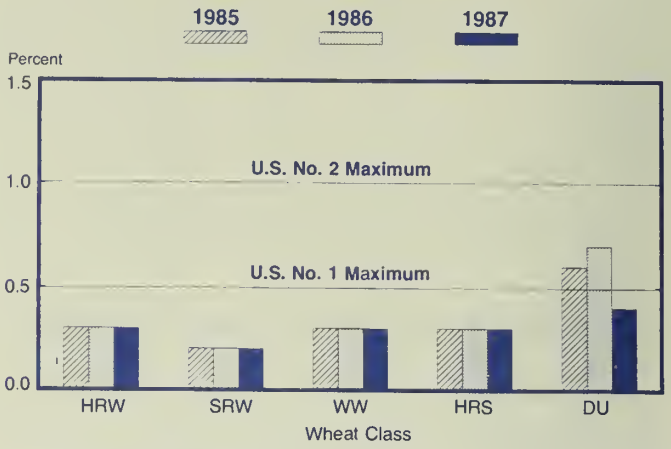


Figure 7
Export Wheat — Average Shrunken and Broken Kernels

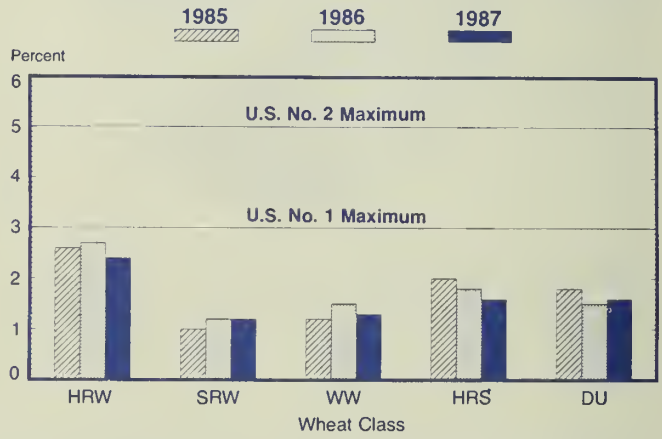


Figure 8
Export Wheat — Average Defects (Total)

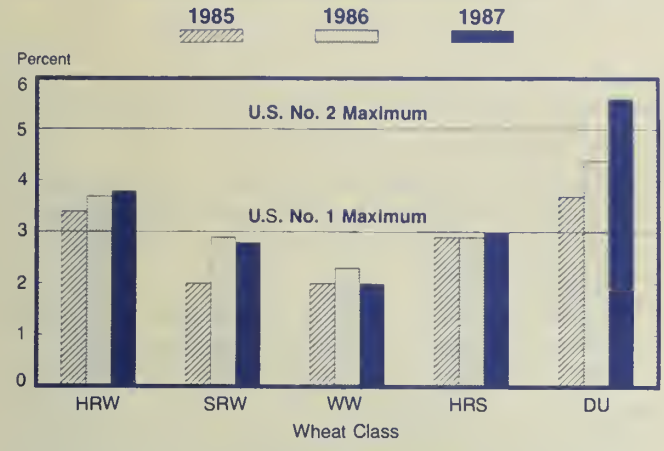


Figure 9
Export Wheat — Average Contrasting Classes

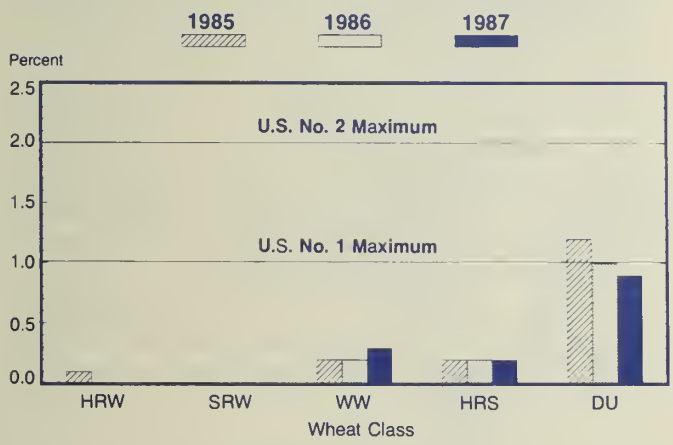


Figure 10
Export Wheat—Average Wheat of Other Classes

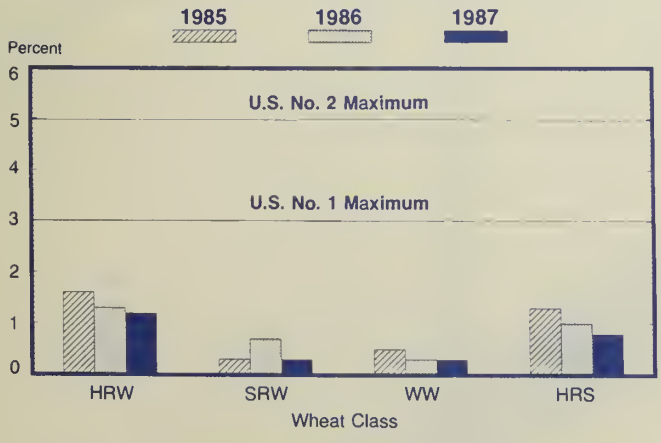
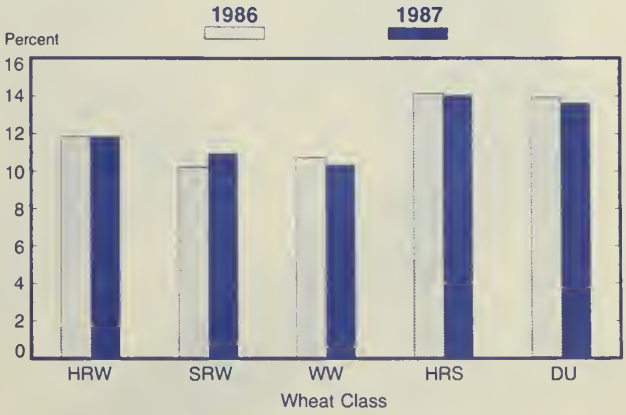


Figure 11
Export Wheat — Average Dockage

Figure 12
Export Wheat — Average Moisture

Figure 13
Export Wheat — Average Protein (12% Moisture Basis)



Note: Data does not represent all wheat lots.
Refer to Table 6 for number of lots represented by class.

Definitions

- **Test weight** is pounds of grain per Winchester bushel.
- **Heat-damaged kernels** are kernels, pieces of wheat kernels, and other grains which have been materially discolored and damaged by heat.
- **Damaged kernels (total)** are kernels, pieces of wheat kernels, and other grains that are badly ground damaged, badly weather damaged, diseased, frost damaged, heat damaged, insect bored, mold damaged, sprout damaged, or otherwise materially damaged.
- **Foreign material** is all matter other than wheat which remains in a sample after removal of dockage and shrunken and broken kernels.
- **Shrunken and broken kernels** are kernels, kernel pieces, and other matter that pass through a 0.064- by 3/8-inch oblong-hole sieve.
- **Total defects** are the sum of three factors: damaged kernels (total), shrunken and broken kernels, and foreign material.
- **Contrasting classes** include:
  —Durum, White, and Unclassed wheats in the classes Hard Red Spring and Hard Red Winter wheats.
  —Hard Red Spring, Hard Red Winter, Soft Red Winter, White, and Unclassed wheats in the class Durum wheat.
  —Durum and Unclassed wheats in the class Soft Red Winter wheat.
  —Hard Red Spring, Durum, Hard Red Winter, and Unclassed wheats in the class White wheat.
- **Wheat of other classes** is any class that is mixed with the predominant class.
- **Dockage** includes chaff, dust, and items removed from a sample by an initial screening with a dockage tester. The percentage of dockage in a sample does not affect the numerical grade.
- **Moisture** is the water content of grain as determined by an approved electronic moisture meter. The percentage of moisture in a sample does not affect the numerical grade.
- **Protein** is the protein content of grain as determined by an approved near infrared reflectance (NIR) instrument calibrated against a Kjeldahl method (percent Nitrogen x 5.7). The percentage of protein in a sample does not affect the numerical grade.
- **Grade** is determined by analyzing the physical and biological factors present in the sample. Limits for the grading factors are established for each numerical grade. Grades range from U.S. No. 1 (highest) to U.S. Sample grade (lowest). When a particular grade is cited in this report, it includes lots certificated at that grade plus lots certificated with the "or better" designation. For example, U.S. No. 2 grade includes lots which were certificated as "U.S. No. 2" and lots certificated as "U.S. No. 2 or better." Factors that exceed the established limits, except for test weight, lower the grade. The established limits for test weight represent minimum requirements for each grade.

Note: All 1985, 1986, and 1987 export wheat average factor values contained in this report have been calculated by weighting individual export lot factor averages by volume.

Export Corn

Background

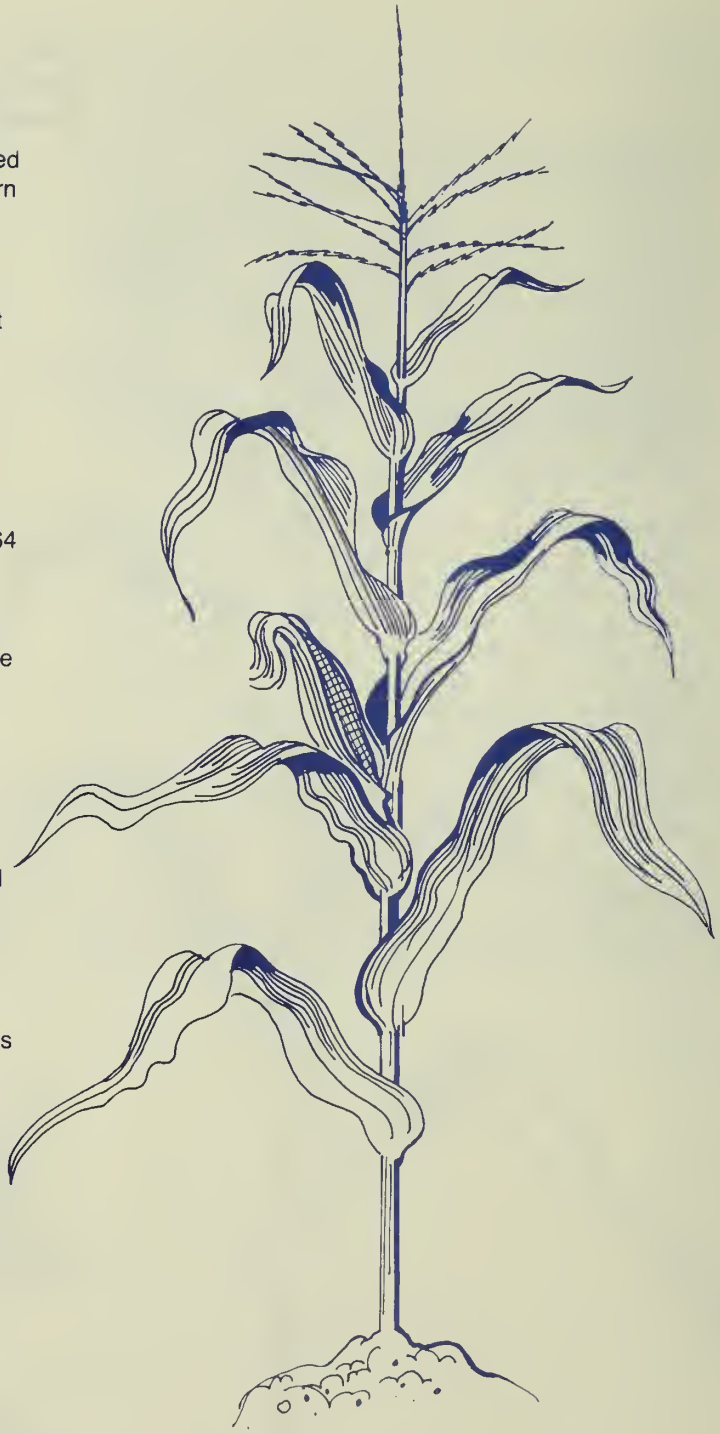
FGIS analyzed the quality data from 1,652 export corn lots inspected during calendar year 1987. The data represented 98.0 percent of the total 1.633 billion bushels of corn exported during 1987. No analysis was made of the 2.0 percent of corn exports for which complete factor information was not available (i.e., single railcar lots, for which complete factor information is not required).

The accompanying tables 10-14 and figures 14-20 represent export corn data. For comparison purposes, some of the tables and figures include export corn quality data for calendar years 1984, 1985, and 1986.

On June 30, 1987, the U.S. Standards for Corn were amended to include separate definitions for "broken corn" and "foreign material." The revised corn standards define broken corn as "all matter that passes readily through a 12/64 inch round-holed sieve and over a 6/64 inch round-holed sieve." The new standards define foreign material as "all matter that passes readily through a 6/64 inch round-holed sieve and all matter other than corn that remains on top of the 12/64 inch round-holed sieve."

The components "broken corn" and "foreign material", separately, are not grading factors. The factor "broken corn and foreign material" remains a grade determining factor. Implementation of these new definitions is contingent upon development and production of a specially designed two-tiered sieve. Once implemented, official inspection personnel will record the individual components "broken corn" and "foreign material" to the nearest tenth percent on the inspection log for export shipments and in the remarks section of the certificates for nonexport shipments.

Corn represented 41.7 percent of the total 3.92 billion bushels of grains and oilseeds inspected for export in 1987. Total 1987 corn exports increased by 52.5 percent over 1986 corn exports. Gulf shipments accounted for 72 percent of the total 1987 corn exports.



Corn Grades and Grade Requirements

Corn is divided into three classes: Yellow corn, White corn, and Mixed corn. There are no subclasses of corn. Yellow corn is the class most often shipped for export from the United States. Each class of corn is divided into five U.S. numerical grades and U.S. Sample grade. Special grades are provided to emphasize special qualities or conditions affecting the value of the corn. These special grades are made a part of the grade designation but do not affect the numerical or Sample grade designation.

U.S. Standards for Corn

Grade	Minimum test weight per bushel *(pounds)*	Maximum limits of—		
		Damaged kernels		Broken corn and foreign material (BCFM) *(percent)*
		Heat-damaged kernels *(percent)*	Total *(percent)*	
U.S. No. 1	56.0	0.1	3.0	2.0
U.S. No. 2	54.0	0.2	5.0	3.0
U.S. No. 3	52.0	0.5	7.0	4.0
U.S. No. 4	49.0	1.0	10.0	5.0
U.S. No. 5	46.0	3.0	15.0	7.0
U.S. Sample grade:				

U.S. Sample grade shall be corn which:

(a) Does not meet the requirements for the grades U.S. Nos. 1, 2, 3, 4, or 5; or

(b) In a 1,000-gram sample, contains 8 or more stones which have an aggregate weight in excess of 0.20 percent of the sample weight, 2 or more pieces of glass, 3 or more crotalaria seeds, 2 or more castor beans, 8 or more cockleburs, 4 or more particles of an unknown substance(s) or a commonly recognized harmful or toxic substance(s), or animal filth in excess of 0.20 percent; or

(c) Has a musty, sour, or commercially objectionable foreign odor; or

(d) Is heating or otherwise of distinctly low quality.

Conclusions

1. In 1987, 36.0 percent of the corn inspected for export was certificated as U.S. No. 2 grade or better, and 63.6 percent was certificated as U.S. No. 3 grade. In 1986, 37.8 percent of the corn inspected for export was certificated as U.S. No. 2 grade or better, and 61.8 percent was certificated as U.S. No. 3 grade.
2. The average test weight level increased from the 1986 average level (from 56.3 to 56.8 pounds per bushel). Eighty-two percent of the 1987 export corn lots contained test weight levels at or greater than the U.S. No. 1 grade minimum of 56.0 pounds per bushel.
3. Average moisture decreased from the 1986 average level (from 14.5 to 14.0 percent). Fifty-seven percent of all export corn lots contained moisture levels at or less than 14.0 percent. All lots contained moisture levels below 15.5 percent moisture.
4. Average broken corn and foreign material (BCFM) remained the same as the 1986 average level of 3.3 percent. Four percent of the 1987 export corn lots contained BCFM levels at or less than the U.S. No. 1 grade maximum of 2.0 percent. Forty-five percent contained BCFM levels at or less than the U.S. No. 2 grade maximum of 3.0 percent. All except six lots contained BCFM levels at or less than the U.S. No. 3 grade maximum of 4.0 percent.
5. Average damaged kernels (total) increased from the 1986 average level (from 3.8 to 4.6 percent). Fifteen percent of the 1987 export corn lots contained damaged kernels (total) levels at or less than the U.S. No. 1 grade maximum of 3.0 percent. Seventy-one percent contained damaged kernels (total) levels at or less than the U.S. No. 2 grade maximum of 5.0 percent. All except nine lots contained damaged kernels (total) levels at or less than the U.S. No. 3 grade maximum of 7.0 percent.
6. Average heat-damaged kernels remained the same as the 1986 average level of 0.0 percent. Ninety-nine percent of the 1987 corn lots contained 0.0 percent of heat-damaged kernels. Thirteen lots contained heat-damaged kernel levels of 0.1 percent.

Table 10. Summary of export corn quality, 1984-87

Factor	Grade	Grade Limit	1984[1] Average	1985[2] Average	1986[3] Average	1987[4] Average	1987[4] Range
Test Weight	U.S. No. 2	54.0	55.7	55.7	56.4	56.8	54.0 - 60.0
	U.S. No. 3	52.0	55.7	55.9	56.3	56.8	52.9 - 59.1
	All Lots		55.7	55.9	56.3	56.8	52.9 - 60.0
Moisture	U.S. No. 2	N/A	14.0	14.4	14.3	14.0	12.5 - 15.1
	U.S. No. 3	N/A	14.1	14.7	14.6	14.0	12.8 - 15.3
	All Lots		14.1	14.7	14.5	14.0	12.4 - 15.3
BCFM	U.S. No. 2	3.0	2.7	2.8	2.8	2.8	1.0 - 3.0
	U.S. No. 3	4.0	3.7	3.6	3.6	3.6	1.2 - 4.0
	All Lots		3.5	3.4	3.3	3.3	0.8 - 6.5
Damaged Kernels (total)	U.S. No. 2	5.0	3.6	2.9	3.3	3.8	0.2 - 4.9
	U.S. No. 3	7.0	4.4	3.2	4.1	5.0	0.4 - 7.0
	All Lots		4.2	3.1	3.8	4.6	0.2 - 11.4
Heat-Damaged Kernels	U.S. No. 2	0.2	0.0	0.0	0.0	0.0	0.0 - 0.1
	U.S. No. 3	0.5	0.0	0.0	0.0	0.0	0.0 - 0.1
	All Lots		0.0	0.0	0.0	0.0	0.0 - 0.1

N/A = Not applicable.

[1] The 1984 results are based on 3 lots of U.S. No. 1 grade, 512 lots of U.S No. 2 grade, 1,124 lots of U.S. No. 3 grade, 8 lots of U.S. No. 4 grade, 12 lots of U.S. No. 5 grade, and 16 lots of U.S. Sample grade.

[2] The 1985 results are based on 1 lot of U.S. No. 1 grade, 406 lots of U.S. No. 2 grade, 1,097 lots of U.S. No. 3 grade, 5 lots of U.S. No. 4 grade, 4 lots of U.S. No. 5 grade, and 3 lots of U.S. Sample grade.

[3] The 1986 results are based on 6 lots of U.S. No. 1 grade, 443 lots of U.S. No. 2 grade, 642 lots of U.S. No. 3 grade, 7 lots of U.S. No. 4 grade, 2 lots of U.S. No. 5 grade, and 1 lot of U.S. Sample grade.

[4] The 1987 results are based on 8 lots of U.S No. 1 grade, 653 lots of U.S. No. 2 grade, 973 lots of U.S. No. 3 grade, 10 lots of U.S. No. 4 grade, 1 lot of U.S. No. 5 grade, and 7 lots of U.S. Sample grade.

Table 11. Summary of export U.S. No. 2 corn quality, factor averages by port region, 1986 and 1987

Factor and Volume	Atlantic 1986	Atlantic 1987	Gulf 1986	Gulf 1987	Lakes 1986	Lakes 1987	Pacific 1986	Pacific 1987	Interior 1986[1]	Interior 1987[2]	U.S. 1986	U.S. 1987
Million Bushels	25	41	284	356	14	30	61	129	4	5	388	561
Test Weight	56.5	56.7	56.7	57.0	56.3	56.0	55.0	56.4	57.0	56.5	56.4	56.8
Moisture	14.4	14.2	14.3	13.9	14.5	14.1	14.2	14.0	14.6	14.0	14.3	14.0
Broken Corn and Foreign Material	2.7	2.7	2.8	2.8	2.5	2.8	2.8	2.8	2.4	2.2	2.8	2.8
Damaged Kernels (total)	3.7	3.9	3.3	3.9	3.9	4.1	3.2	3.7	3.6	3.6	3.3	3.8
Heat-Damaged Kernels	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1] Represents only 21 percent of total U.S. No. 2 grade corn exports from the Interior.
[2] Represents only 18 percent of total U.S. No. 2 grade corn exports from the Interior.

Table 12. Summary of export U.S. No. 3 corn quality, factor averages by port region, 1986 and 1987

Factor and Volume	Atlantic 1986	Atlantic 1987	Gulf 1986	Gulf 1987	Lakes 1986	Lakes 1987	Pacific 1986	Pacific 1987	Interior 1986[1]	Interior 1987[2]	U.S. 1986	U.S. 1987
Million Bushels	57	43	493	820	21	40	90	128	<1	2	661	1033
Test Weight	56.2	57.1	56.6	57.0	56.4	56.0	54.6	56.3	56.7	56.5	56.3	56.8
Moisture	14.9	14.3	14.5	13.9	14.6	14.2	14.6	14.1	15.0	14.3	14.6	14.0
Broken Corn and Foreign Material	3.6	3.6	3.6	3.6	3.5	3.7	3.7	3.6	3.0	3.0	3.6	3.6
Damaged Kernels (total)	3.8	5.0	4.3	5.1	5.0	5.5	3.2	4.7	4.4	4.6	4.1	5.0
Heat-Damaged Kernels	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1] Represents only 65 percent of total U.S. No. 3 grade corn exports from the Interior.
[2] Represents only 32 percent of total U.S. No. 3 grade corn exports from the Interior.

Table 13. Summary of export corn quality, factor averages by port region, 1986 and 1987

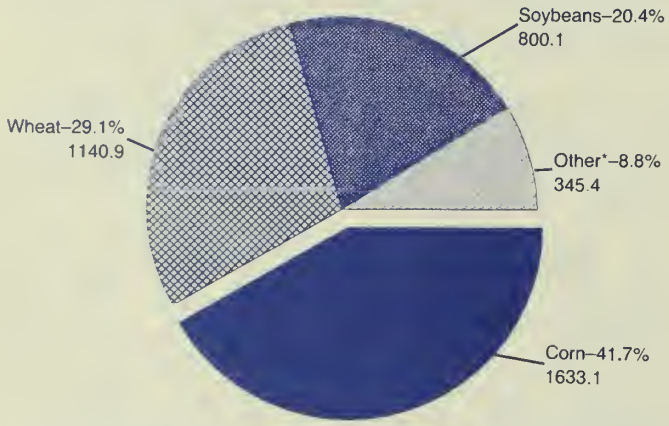
Factor and Volume	Atlantic 1986	Atlantic 1987	Gulf 1986	Gulf 1987	Lakes 1986	Lakes 1987	Pacific 1986	Pacific 1987	Interior 1986[1]	Interior 1987[2]	U.S. 1986	U.S. 1987
Million Bushels	82	84	780	1181	35	71	151	257	5	7	1052	1601
Test Weight	56.3	56.9	56.7	57.0	56.4	56.0	54.8	56.3	57.0	56.5	56.3	56.8
Moisture	14.7	14.3	14.4	13.9	14.6	14.2	14.5	14.1	14.6	14.1	14.5	14.0
Broken Corn and Foreign Material	3.3	3.2	3.3	3.4	3.1	3.3	3.4	3.2	2.4	2.4	3.3	3.3
Damaged Kernels (total)	3.8	4.4	3.9	4.7	4.6	4.9	3.2	4.2	3.7	3.9	3.8	4.6
Heat-Damaged Kernels	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1] Represents only 21 percent of total corn exports from the Interior.
[2] Represents only 20 percent of total corn exports from the Interior.

Table 14. 1987 U.S. corn exports: number of lots and volume certificated, by grade

Grade	Number of Lots	Million Bushels
U.S. No. 1	82	3.2
U.S. No. 2	956	585.2
U.S. No. 3	1,046	1,037.8
U.S. No. 4	10	4.4
U.S. No. 5	1	0.0
U.S. Sample Grade	9	1.7
Not Inspected	4	0.7
Total	2,108	1,633.0

Figure 14
1987 U.S. Grain Exports — Percent of Total Volume/ Million Bushels



* Other includes sorghum, barley, rye, oats, flaxseed, and sunflower seeds.

Figure 15
1987 Corn Exports — Grade Distribution

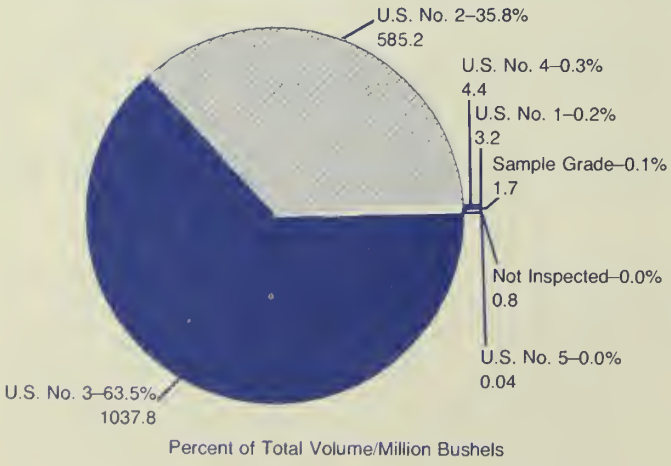


Figure 16
Annual U.S. Corn Export Volume — By Port Region

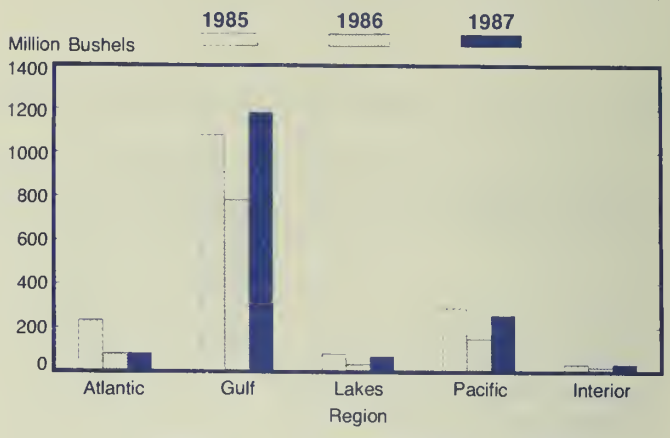


Figure 17
Export Corn — Average Test Weight — For U.S. No. 2 lots, U.S. No. 3 lots, and All lots

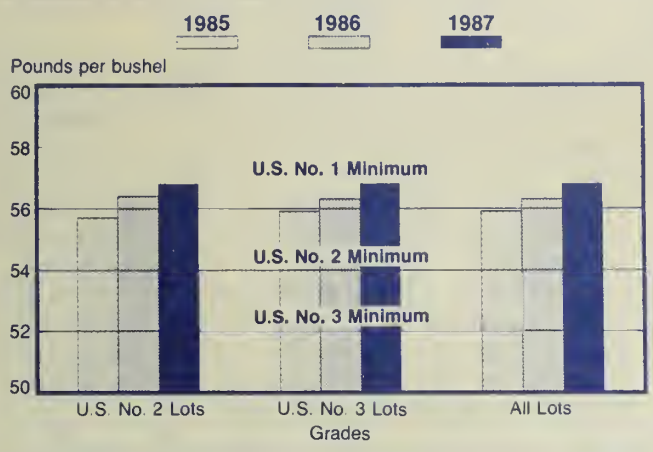
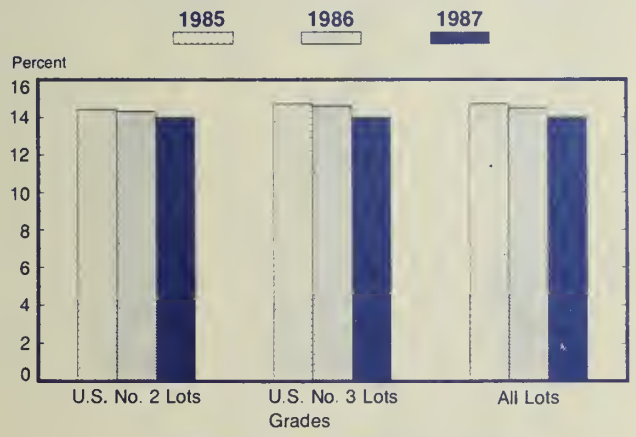


Figure 18
Export Corn — Average Moisture — For U.S. No. 2 lots, U.S. No. 3 lots, and All lots



Note: Moisture is not a grading factor for corn.

Figure 19
Export Corn — Average BCFM — For U.S. No. 2 lots, U.S. No. 3 lots, and All lots

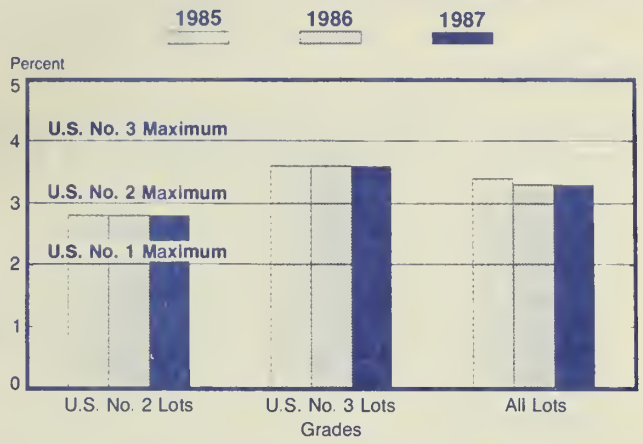
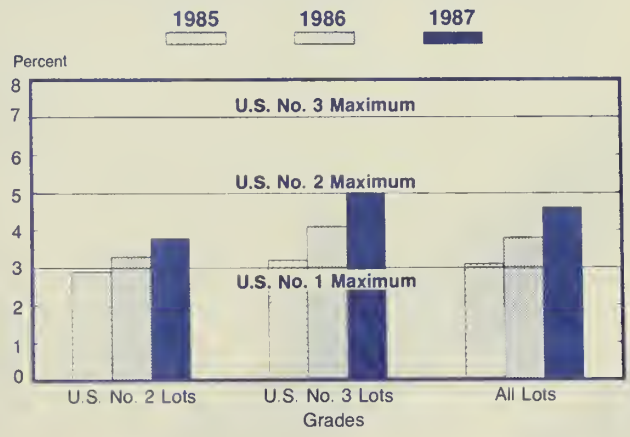


Figure 20
Export Corn — Average Damaged Kernels (total) — For U.S. No. 2 lots, U.S. No. 3 lots, and All lots



Definitions

- **Test weight** per bushel is a determination of the number of pounds of corn in a Winchester bushel.
- **Moisture** is the water content of corn as determined by an approved electronic moisture meter. The percentage of moisture in a sample does not affect the numerical grade.
- **Broken corn and foreign material (BCFM)** is composed of kernels and pieces of kernels of corn and all matter other than corn which will pass readily through a 12/64-inch sieve, and all matter other than corn which remains in the sieved sample.
- **Damaged kernels (total)** are kernels and pieces of kernels of corn which are damaged by heat, sprouting, frost, discoloration, weather, mold, disease, or other types of damage.
- **Heat-damaged kernels** are kernels and pieces of corn kernels that are materially discolored and damaged by heat.
- **Grade** is determined by analyzing the physical and biological factors present in the sample. Limits for the grading factors are established for each numerical and Sample grade. Grades range from U.S. No. 1 (highest) to U.S. Sample grade (lowest). When a particular grade is cited in this report, it includes lots certificated at that grade plus lots certificated with the "or better" designation. For example, U.S. No. 2 grade includes lots certificated as "U.S. No. 2" and lots certificated as "U.S. No. 2 or better." Factors that exceed the established limits lower the numerical grade, except for test weight where established limits represent minimum requirements for each grade.
- **Note:** All 1985, 1986, and 1987 average factor values contained in this report have been calculated by weighting individual export lot factor averages by volume.

Export Soybeans

Background

FGIS analyzed the quality data from 975 export Yellow soybean lots inspected during 1987. The data represented 97.3 percent of the total 800.11 million bushels of soybeans inspected for export during calendar year 1987. No analysis was made of the 2.7 percent of soybean exports for which complete factor information was not available.

The accompanying tables 15-19 and figures 21-29 represent export soybean data. For comparison purposes, some of the tables include export soybean quality data for calendar years 1984, 1985, and 1986.

Soybeans represented 20.4 percent of the total 3.92 billion bushels of grains and oilseeds inspected for export in 1987. Soybean shipments from the Gulf of Mexico accounted for 86 percent of the total 1987 soybean exports. Total 1987 soybean exports increased by 1.3 percent over 1986 soybean exports.

Soybean Grades and Grade Requirements

There are two classes of soybeans: Yellow soybeans and Mixed soybeans. There are no soybean subclasses. The class Yellow soybeans is the class most commonly exported by the U.S. market. Each class is divided into four U.S. numerical grades and U.S. Sample grade. Special grades are provided to emphasize special qualities or conditions affecting the value of the soybeans. These special grades are a part of the grade designation but do not affect the numerical or Sample grade designation.

U.S. Standards for Soybeans

Grade	Minimum test weight per bushel (pounds)	Maximum limits of—				
		Damaged kernels		Foreign material (percent)	Splits (percent)	Soybeans of other colors (percent)
		Heat-damaged (percent)	Total (percent)			
U.S. No. 1	56.0	0.2	2.0	1.0	10.0	1.0
U.S. No. 2	54.0	0.5	3.0	2.0	20.0	2.0
U.S. No. 3[1]	52.0	1.0	5.0	3.0	30.0	5.0
U.S. No. 4[2]	49.0	3.0	8.0	5.0	40.0	10.0
U.S. Sample grade						

U.S. Sample grade shall be soybeans which:

(a) Do not meet the requirements for U.S. Nos. 1, 2, 3, or 4; or

(b) Contain 8 or more stones which have an aggregate weight in excess of 0.2 percent of the sample weight, 2 or more pieces of broken glass, 3 or more Crotalaria seeds, 2 or more castor beans, 4 or more particles of an unknown foreign substance(s) or a commonly recognized harmful or toxic foreign substance(s), 10 or more rodent pellets, bird droppings, or an equivalent quantity of other animal filth per 1,000 grams of soybeans; or

(c) Have a musty, sour, or commercially objectionable foreign odor (except garlic odor); or

(d) Are heating or otherwise of distinctly low quality.

[1] Soybeans which are purple mottled or stained shall be graded not higher than U.S. No. 3.
[2] Soybeans which are materially weathered shall be graded not higher than U.S. No. 4.

Conclusions

1. In 1987, 90.9 percent of the soybeans inspected for export were U.S. No. 2 grade or better and 8.1 percent were U.S. No. 3 grade. In calendar year 1986, 86.9 percent of the soybeans inspected for export were U.S. No. 2 grade or better and 10.1 percent were U.S. No. 3 grade.
2. Average test weight increased from the 1986 average (from 55.5 to 55.8). Ninety-nine percent of all export soybean lots showed test weight levels of at least 54.0 pounds per bushel, the U.S. No. 2 grade minimum.
3. Average moisture decreased from the 1986 average (from 12.9 to 12.6 percent). Sixty-nine percent of the soybean lots contained moisture levels of 13.0 percent or less. All except two export soybean lots contained moisture levels of 14.0 percent or less.
4. Average splits decreased slightly from the 1986 average (from 9.4 to 9.3 percent). Sixty-nine percent of the 1987 export soybean lots contained splits levels at or less than the U.S. No. 1 grade maximum of 10.0 percent. All except four soybean lots contained splits levels at or below the U.S. No. 2 grade maximum of 20.0 percent.
5. Average damaged kernels (total) decreased from the 1986 average (from 2.0 to 1.6 percent). Seventy-six percent of the 1987 soybean lots contained damaged kernels (total) levels at or less than the U.S. No. 1 grade maximum of 2.0 percent. Ninety-nine percent contained damaged kernels (total) levels at or less than the U.S. No. 2 grade maximum of 3.0 percent.
6. Average heat-damaged kernels increased from the 1986 average (from 0.1 to 0.2 percent). Seventy-seven percent of the 1987 soybean lots contained heat-damaged kernels levels at or less than the U.S. No. 1 grade maximum of 0.2 percent. All except four lots contained heat-damaged kernels levels at or less than the U.S. No. 2 grade maximum of 0.5 percent.
7. Average foreign material decreased from the 1986 average (from 1.9 to 1.7 percent). Thirteen percent of the 1987 export soybean lots contained foreign material levels at or less than 1.0 percent, the U.S. No. 1 grade maximum. Ninety-four percent contained foreign material levels at or less than 2.0 percent, the U.S. No. 2 grade maximum. Five lots contained more than 3.0 percent foreign material.
8. Average soybeans of other colors increased from the 1986 average (from 0.0 to 0.1 percent). All 1987 soybean lots contained soybeans of other colors levels at or less than the U.S. No. 1 grade maximum of 1.0 percent.

Table 15. Quality of export Yellow soybeans, 1984-87

Factor	Grade	Grade limit	1984 Average[1]	1985 Average[2]	1986 Average[3]	1987 Average[4]	1987 Range[4]
Test Weight	U.S. No. 2	54.0	55.7	55.4	55.6	55.8	54.0 - 60.0
	U.S. No. 3	52.0	55.4	55.1	55.1	55.3	53.1 - 60.0
	All Lots		55.6	55.4	55.5	55.8	46.0 - 60.0
Moisture	U.S. No. 2	N/A	12.6	13.0	12.9	12.5	9.6 - 14.0
	U.S. No. 3	N/A	12.8	13.2	13.0	12.8	10.4 - 14.3
	All Lots		12.6	13.0	12.9	12.6	9.6 - 14.3
Splits	U.S. No. 2	20.0	7.3	5.9	9.2	9.2	0.0 - 20.0
	U.S. No. 3	30.0	7.8	6.7	10.6	10.4	5.0 - 22.0
	All Lots		7.4	5.9	9.4	9.3	0.0 - 51.0
Damaged Kernels (total)	U.S. No. 2	3.0	1.0	1.5	1.9	1.6	0.0 - 3.0
	U.S. No. 3	5.0	1.1	1.7	2.3	2.0	0.2 - 4.3
	All Lots		1.0	1.5	2.0	1.6	0.0 - 40.3
Heat-Damaged Kernels	U.S. No. 2	0.5	0.0	0.1	0.1	0.2	0.0 - 0.5
	U.S. No. 3	1.0	0.0	0.0	0.1	0.2	0.0 - 0.7
	All Lots		0.0	0.1	0.1	0.2	0.0 - 22.4
Foreign Material	U.S. No. 2	2.0	1.8	1.8	1.8	1.6	0.1 - 2.0
	U.S. No. 3	3.0	2.4	2.4	2.5	2.6	1.3 - 3.0
	All Lots		1.9	1.9	1.9	1.7	0.0 - 31.4
Soybeans of Other Colors	U.S. No. 2	2.0	0.0	0.0	0.0	0.1	0.0 - 1.0
	U.S. No. 3	5.0	0.0	0.0	0.0	0.0	0.0 - 0.5
	All Lots		0.0	0.0	0.0	0.1	0.0 - 1.0

N/A = Not applicable.

[1] 1984 results are based on 9 lots of U.S. No. 1 grade, 574 lots of U.S. No. 2 grade, 64 lots of U.S. No. 3 grade, 4 lots of U.S. No. 4 grade, and 2 lots of U.S. Sample grade.

[2] 1985 results are based on 16 lots of U.S. No. 1 grade, 490 lots of U.S. No. 2 grade, 68 lots of U.S. No. 3 grade, 5 lots of U.S. No. 4 grade, and 1 lot of U.S. Sample grade.

[3] 1986 results are based on 23 lots of U.S. No. 1 grade, 767 lots of U.S. No. 2 grade, 82 lots of U.S. No. 3 grade, 16 lots of U.S. No. 4 grade, and 11 lots of U.S. Sample grade.

[4] 1987 results are based on 39 lots of U.S. No. 1 grade, 857 lots of U.S. No. 2 grade, 70 lots of U.S. No. 3 grade, 2 lots of U.S. No. 4 grade, and 7 lots of U.S. Sample grade.

Table 16. Summary of export U.S. No. 2 Yellow soybean quality, factor averages by port region, 1986 and 1987

Factor and Volume	Atlantic 1986	Atlantic 1987	Gulf 1986	Gulf 1987	Lakes 1986	Lakes 1987	Pacific 1986	Pacific 1987	Interior 1986[1]	Interior 1987[2]	U.S. 1986	U.S. 1987
Million Bushels	44	21	562	607	43	42	15	20	5	7	669	697
Test Weight	55.8	56.2	55.5	55.7	56.4	56.4	56.9	56.8	55.8	58.0	55.6	55.8
Moisture	13.4	12.9	12.8	12.5	13.4	12.8	12.3	12.0	12.1	12.7	12.9	12.5
Splits	10.1	7.8	9.4	9.4	5.3	7.0	9.3	8.3	11.8	12.2	9.2	9.2
Damaged Kernels (total)	1.8	1.5	2.0	1.7	1.2	1.2	0.4	0.5	0.9	1.4	1.9	1.6
Heat-Damaged Kernels	0.1	0.1	0.1	0.2	0.2	0.2	0.0	0.0	0.0	0.2	0.1	0.2
Foreign Material	1.7	1.7	1.8	1.6	1.6	1.7	1.5	1.5	1.6	1.6	1.8	1.6
Soybeans of Other Colors	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1

[1] Represents only 35 percent of total 1986 U.S. No. 2 grade soybean exports from the Interior.
[2] Represents only 31 percent of total 1987 U.S. No. 2 grade soybean exports from the Interior.

Table 17. Summary of export U.S. No. 3 Yellow soybean quality, factor averages by port region, 1986 and 1987

Factor and Volume	Atlantic 1986	Atlantic 1987	Gulf 1986	Gulf 1987	Lakes 1986	Lakes 1987	Pacific 1986	Pacific 1987	Interior 1986	Interior 1987[1]	U.S. 1986	U.S. 1987
Million Bushels	4	<1	76	64	<1	<1	—	—	—	<1	80	66
Test Weight	54.7	57.7	55.1	55.3	56.0	55.6	—	—	—	60.0	55.1	55.3
Moisture	13.0	11.7	13.0	12.8	13.6	14.0	—	—	—	12.6	13.0	12.8
Splits	10.7	5.0	10.6	10.5	11.0	10.0	—	—	—	14.0	10.6	10.4
Damaged Kernels (total)	3.0	0.9	2.3	2.0	3.5	2.1	—	—	—	2.4	2.3	2.0
Heat-Damaged Kernels	0.1	0.0	0.1	0.2	0.0	0.4	—	—	—	0.4	0.1	0.2
Foreign Material	2.6	2.5	2.5	2.6	2.2	2.9	—	—	—	1.8	2.5	2.6
Soybeans of Other Colors	0.0	0.0	0.0	0.0	0.0	0.0	—	—	—	0.0	0.0	0.0

[1] Represents only 38 percent of total 1987 U.S. No. 3 grade soybean exports from the Interior.

Table 18. Summary of export Yellow soybean quality, factor averages by port region, 1986 and 1987

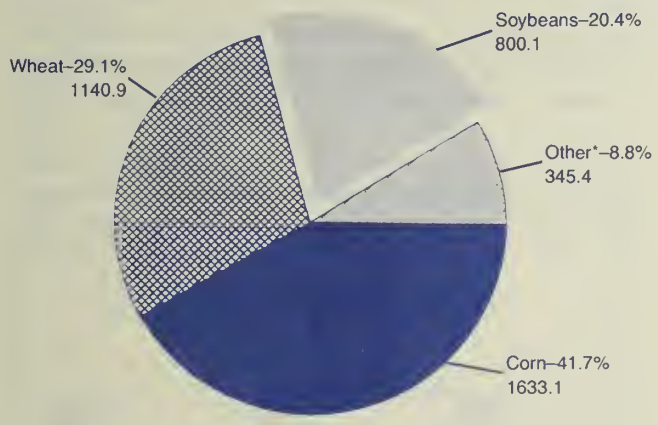
Factor and Volume	Atlantic 1986	Atlantic 1987	Gulf 1986	Gulf 1987	Lakes 1986	Lakes 1987	Pacific 1986	Pacific 1987	Interior 1986[1]	Interior 1987[2]	U.S. 1986	U.S. 1987
Million Bushels	58	22	653	684	43	42	18	22	5	8	777	778
Test Weight	55.4	56.3	55.5	55.7	56.4	56.4	56.8	56.8	55.8	58.1	55.5	55.8
Moisture	13.3	12.9	12.9	12.6	13.4	12.9	12.3	11.8	12.1	12.7	12.9	12.6
Splits	10.7	7.7	9.6	9.5	5.3	7.0	9.0	8.1	11.8	12.2	9.4	9.3
Damaged Kernels (total)	2.4	1.5	2.0	1.7	1.2	1.2	0.4	0.5	0.9	1.5	2.0	1.6
Heat-Damaged Kernels	0.1	0.1	0.1	0.2	0.2	0.2	0.0	0.0	0.0	0.2	0.1	0.2
Foreign Material	2.0	1.7	1.9	1.7	1.6	1.7	1.4	1.5	1.6	1.6	1.9	1.7
Soybeans of Other Colors	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1

[1] Represents only 33 percent of total 1986 Soybean exports from the Interior.
[2] Represents only 31 percent of total 1987 Soybean exports from the Interior.

Table 19. 1987 U.S. Soybean Exports: Number of lots and volume certificated, by grade

Grade	Number of Lots	Million Bushels
U.S. No. 1	47	13.5
U.S. No. 2	1,021	713.5
U.S. No. 3	92	66.0
U.S. No. 4	19	1.4
U.S. Sample Grade	15	1.0
Not Inspected	5	4.7
Total	1,199	800.1

Figure 21
1987 U.S. Grain Exports — Percent of Total Volume/ Million Bushels



* Other includes sorghum, barley, rye, oats, flaxseed, and sunflower seeds.

Figure 22
1987 Soybean Exports—Grade Distribution

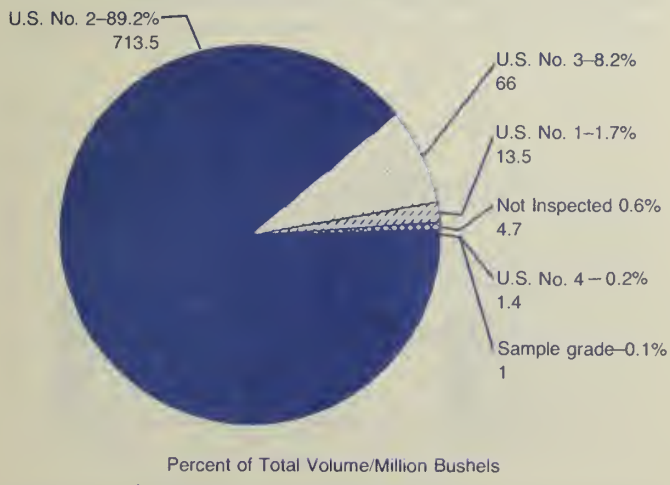
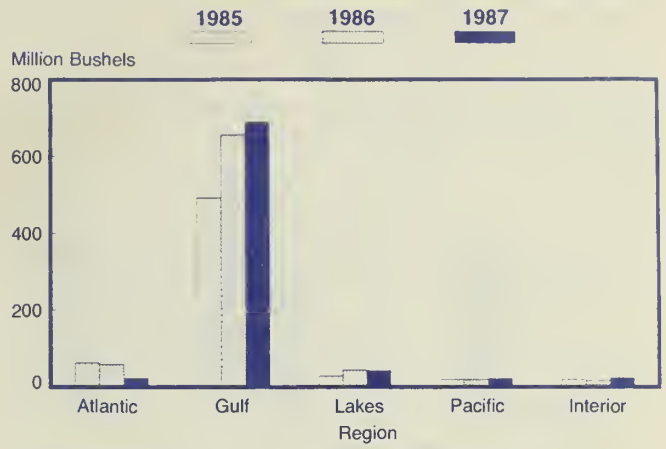


Figure 23
Annual U.S. Soybean Export Volume — By Port Region



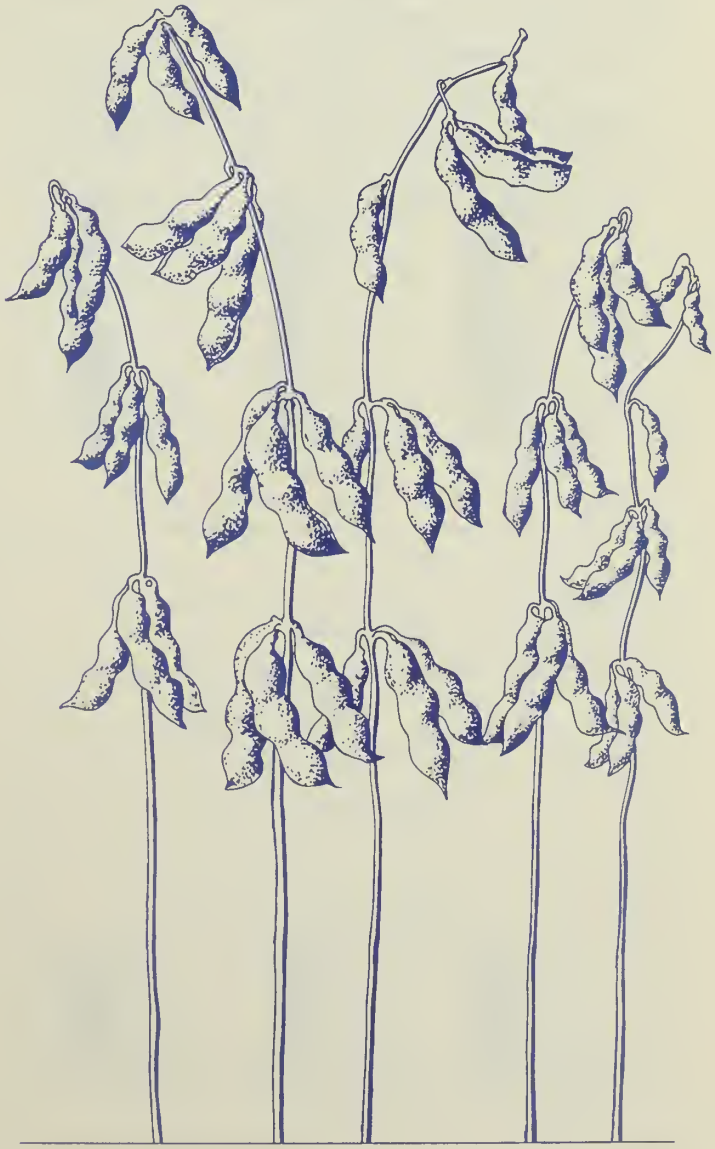


Figure 24
Export Soybeans — Average Test Weight — For U.S. No. 2 lots, U.S. No. 3 lots, and All lots

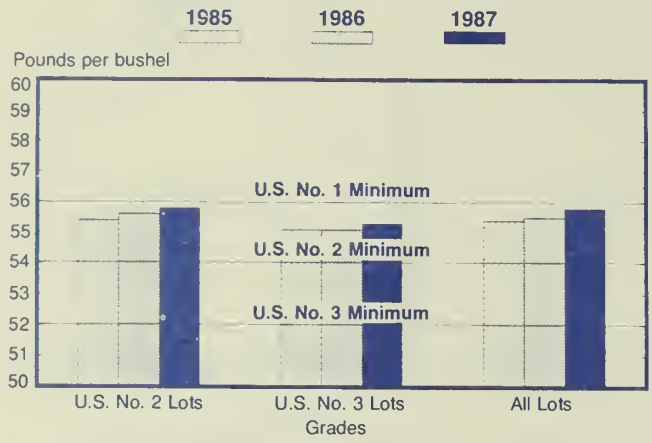
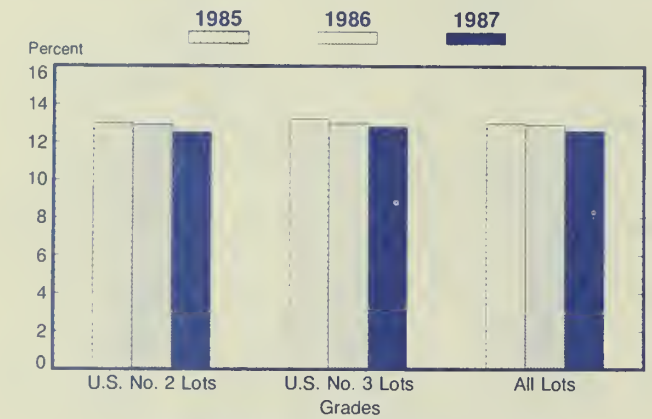


Figure 25
Export Soybeans — Average Moisture — For U.S. No. 2 lots, U.S. No. 3 lots, and All lots



Note: Moisture is not a grading factor for soybeans.

Figure 26
Export Soybeans — Average Splits — For U.S. No. 2 lots, U.S. No. 3 lots, and All lots

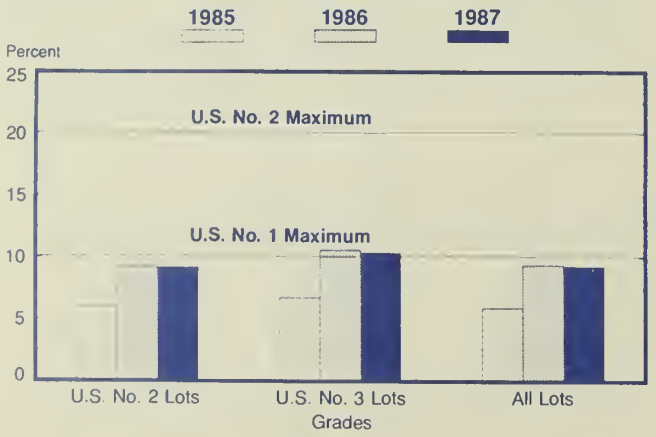


Figure 27
Export Soybeans — Average Damaged Kernels (total) — For U.S. No. 2 lots, U.S. No. 3 lots, and All lots

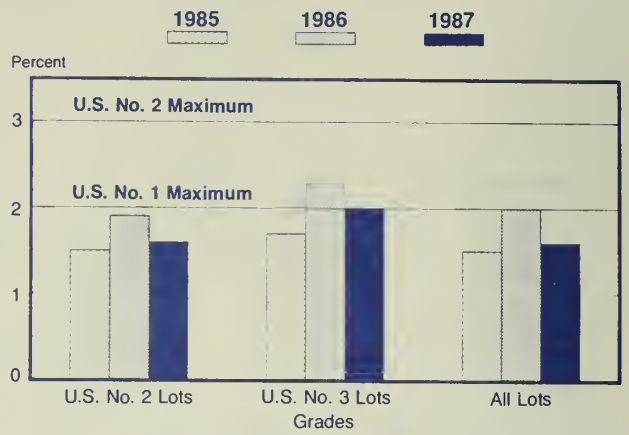


Figure 28
Export Soybeans — Average Heat-Damaged Kernels — For U.S. No. 2 lots, U.S. No. 3 lots, and All lots

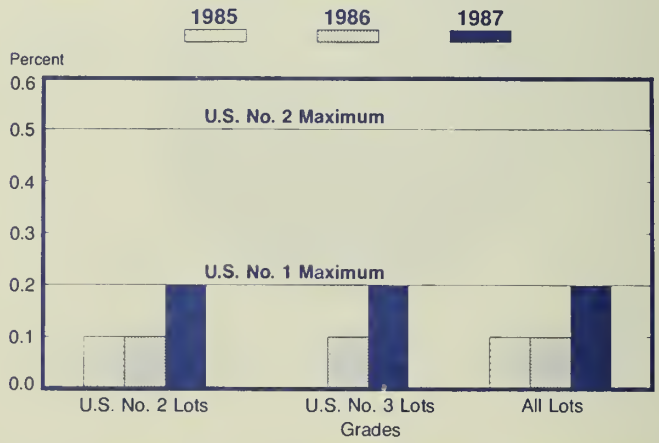
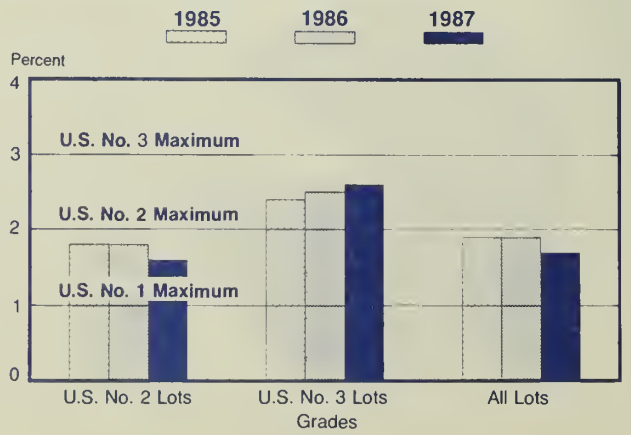


Figure 29
Export Soybeans — Average Foreign Material — For U.S. No. 2 lots, U.S. No. 3 lots, and All lots



Definitions

- **Test weight** per bushel is a determination of the number of pounds of soybeans in a Winchester bushel.
- **Moisture** is the water content of soybeans as determined by an approved electronic moisture meter. The percentage of moisture in a sample does not affect the numerical grade.
- **Splits** are soybeans with more than one-fourth of the bean removed and which are not damaged.
- **Damaged kernels** are soybeans and pieces of soybeans which are badly ground damaged, badly weather damaged, diseased, frost damaged, heat damaged, insect bored, mold damaged, sprout damaged, stinkbug-stung, or otherwise materially damaged.
- **Heat-damaged kernels** are soybeans and pieces of soybeans which are materially discolored and damaged by heat.
- **Foreign material** is all matter, including soybeans and pieces of soybeans, that will pass readily through an 8/64-inch sieve and all matter other than soybeans remaining on the sieve after sieving.
- **Soybeans of other colors** are soybeans which have green, black, brown, or bicolored seed coats. Before September 9, 1985, this factor was called "brown, black, and/or bicolored soybeans in yellow or green soybeans."
- **Grade** is determined by analyzing the physical and biological factors present in the sample. Limits for the grading factors are established for each numerical and Sample grade. Grades range from U.S. No. 1 (highest) to U.S. Sample grade (lowest). When a particular grade is cited in this report, it includes lots certificated at that grade plus lots certificated with the "or better" designation. For example, U.S. No. 2 grade includes lots certificated as "U.S. No 2" and lots certificated as "U.S. No. 2 or better." Factors that exceed the established limits lower the numerical grade, except for test weight where established limits represent minimum requirements for each grade.
- **Note:** All 1985, 1986, and 1987 average factor values contained in this report have been calculated by weighting individual export lot factor averages by volume. The averages for splits represent the average of certificated values which were truncated to whole percents. The actual averages for the factor splits could be as much as 1.0 percent higher than the averages shown in this report.

U.S. GOVERNMENT PRINTING OFFICE 1988 - 521-113 - 1302/00160

UNIVERSITY OF ILLINOIS-URBANA
3 0112 048152950